# SKULL-PHOTO SUPERIMPOSITION: THE STATE OF THE ART IN MALAYSIA AND ITS LEGAL SIGNIFICANCE

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## ABSTRACT

The utility of the so-called skull-photo superimposition has been well established in many parts of a country, for example India, Australia, and New Zealand. The admissibility of the technique as an evidence was recognized and accepted in their court of law. Skull-photo superimposition is a technique whereby an unknown skull is superimposed or laid on the photograph of a suspected dead person in an attempt to make identification by appreciating and analyzing the match between the two. Skull-photo superimposition is a supplementary technique and used to establish identification of dead bodies. Present study aimed to investigate the utility of skull-photo superimposition technique in Malaysia and the admissibility of the skull-photo evidence in court. From the research findings, skull-photo superimposition technique was not much progressing in Malaysia. The technique has not been employed in institutions (e.g. Royal Malaysian Police (RMP), Chemistry Department of Malaysia, teaching hospitals, and governmental hospital) which play a critical role in forensic investigation. In a very real sense, skull-photo superimposition was not utilized as one of the means of human identification. However, Faculty of Dentistry, University of Malaya (UM) and University Kebangsaan Malaysia Medical Centre (UKMMC) has the superimposition set-up in their laboratories. The facility was mainly used for a research purpose. Unfortunately, the superimposition set-up in Faculty of Dentistry, University of Malaya (UM) has been dismantled as no cases submitted for identification. The superimposition set-up was developed based on technique conceived by Furue (comprised of mirrors, skull mounting, panning motor, light, lighting controls, stands and grids) and was considered to be obsolete. So far, no effort was initiated to replace it with a new assembly. Interestingly, University Kebangsaan Malaysia Medical Centre (UKMMC) has employed skull-photo superimposition in one reported criminal case and the victim has positively identified by superimposition technique and accompanied with other articles (e.g. earring which was found similar wore by the victim as shown in the photograph). Further details of the case were inaccessible for confidentiality matter. Formerly, foreign expert from Japan, Professor Dr. Masatsugu Hashimoto was called to conduct skull-photo superimposition in attempt to make identification of victim in a several celebrated murder cases in Malaysia (e.g. John Nyumbek's case and Mona Fandey's case), and has positively identify the victims. While, identification of deceased, Along Spoon was conducted by skull and dental superimposition and was performed by staff of Studio B, Sri Pentas TV3. From the presented cases, it showed that skull-photo superimposition can be very useful in forensic investigation and its utility is highlighted particularly during investigation stage. The evidence of skull-photo can corroborate and strengthen other scientific evidences (e.g. DNA, fingerprint, and dental evidence). Evidence of "skull-photo superimposition" is admissible in Malaysian court. Skull-photo superimposition is highly recommended in our country on several grounds. The utilization of skull-photo superimposition can be a very helpful in establishing an individual identification in forensic investigation, and the evidence can be taken as corroborative evidence to complement other scientific evidence such as DNA, fingerprint, and dental evidence. On occasion, the quality and quantity of confirmatory evidences such as DNA, fingerprint and dental may be questionable and limited, thus preclude complete human identification. Therefore, the inclusion of skull-photo evidence can increase the percentage of identification. Recognizant about this, skull-photo superimposition is important to be made into realization to furnish inherent flaw that may exist in other identification techniques.

## ABSTRAK

Teknik "skull-photo superimposition" telah digunakan di negara seperti India, Australia, dan New Zealand. Teknik ini telah diterima pakai di dalam mahkamah sebagai bahan bukti. Teknik "skull-photo superimposition" adalah satu teknik di mana tengkorak manusia yang tidak diketahui identitinya ditindih di antara satu sama lain dengan gambar mangsa. Analisis dilaksanakan dengan mengkaji sama ada padanan yang sempurna wujud di antara tengkorak manusia dengan gambar mangsa. Teknik "skull-photo superimposition" merupakan teknik tambahan dan digunakan untuk pengenalpastian mayat. Tujuan kajian ini adalah untuk mengkaji tahap pencapaian teknik "skull-photo superimposition" dan penerimaan teknik dan bahan bukti "skull-photo superimposition" di mahkamah di Malaysia. Hasil kajian ini mendapati bahawa teknik "skull-photo superimposition" tidak begitu berkembang di Malaysia. Tambahan pula, institusi-institusi yang memainkan peranan penting dalam penyiasatan forensik (contohnya Polis DiRaja Malaysia (PDRM), Jabatan Kimia Malaysia (JKM), pusat-pusat perubatan dan hospital kerajaan) tidak menggunakan teknik ini untuk pengenalpastian mayat. Dalam erti kata lain, teknik ini tidak digunakan sebagai salah satu teknik identifikasi manusia. Walau bagaimanapun, institusi-institusi seperti Fakulti Pergigian, Universiti Malaya (UM) dan Pusat Perubatan Universiti Kebangsaan Malaysia (PPUKM) mempunyai makmal yang menempatkan peralatan "skull-photo superimposition". Peralatan yang disediakan hanya digunakan untuk tujuan kajian. Malangnya selepas beberapa tahun, peralatan "skull-photo superimposition" di Fakulti Pergigian, Universiti Malaya (UM) sudah tidak digunakan atas sebab tiada kes yang dirujuk. Kelengkapan "skull-photo superimposition" telah diadaptasi dari teknik yang diilhamkan oleh Furue (terdiri daripada cermin, tapak tengkorak, motor, lampu, tapak dan grid) dan tambahan pula, teknik ini tidak digunakan lagi. Sehingga kini, tiada usaha dan langkah yang diambil untuk menggantikannya dengan kelengkapan yang bau. Menariknya Pusat Perubatan Universiti Kebangsaan Malaysia (PPUKM) telah mengaplikasikan teknik ini di dalam satu kes pembunuhan, dan hasil analisis mendapati bahawa si mati telah dikenal pasti identitinya melalui teknik "skull-photo superimposition". Pengenalpastian mayat disahkan lagi dengan penemuan bukti lain yang dipercayai juga milik mangsa yang telah dikenal pasti melalui gambar si mangsa (contoh, subang). Maklumat lanjut mengenai kes tersebut tidak dapat diakses atas alasan sulit. Beberapa lama dahulu, pakar dari Jepun, Profesor Dr. Masatsugu Hashimoto telah dipanggil untuk menjalankan pengenalpastian mayat dalam beberapa kes pembunuhan di Malaysia (contohnya kes John Nyumbek dan kes Mona Fandey) dan telah berjaya membuat pengenalpastian mayat. Sementara itu, pengenalpastian mayat Along Spoon telah dilakukan melalui "skull superimposition" dan "dental superimposition" yang dijalankan oleh kakitangan Studio B, Sri Pentas TV3. Daripada kes-kes yang telah dipaparkan di dalam kajian ini, teknik "skull-photo superimposition" amat berguna dalam penyiasatan forensik terutamanya semasa peringkat penyiasatan. Bukti "skull-photo superimposition" boleh menyokong dan menguatkan bukti-bukti saintifik lain (contohnya bukti DNA, cap jari, dan gigi). Bahan bukti "skull-photo superimposition" diterima pakai di dalam mahkamah Malaysia. Teknik "skull-photo superimposition" di Malaysia amat disyorkan atas beberapa alasan. Penggunaaan "skull-photo superimposition" boleh digunakan untuk pengenalpastian mayat dalam penyiasatan forensic dan boleh dijadikan bahan bukti untuk menyokong bahan-bahan bukti lain seperti bukti DNA, cap jari, dan gigi. Kadang-kadang, kuantiti dan kualiti bahan-bahan bukti lain seperti DNA, cap jari, dan gigi boleh dipertikaikan dan terhad. Keadaan ini boleh menghalang untuk mencapai pengenalpastian yang lengkap dan sempurna. Oleh kerana itu, bukti "skull-photo superimposition" boleh menambahkan peratus pengesahan pengenalpastian. Menyedari akan hal ini, adalah penting untuk merealisasikan teknik "skull-photo superimposition" sebagai salah satu teknik pengenalpastian untuk menampung sebarang kecacatan yang mungkin wujud dalam teknik-teknik pengenalpastian yang lain.

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*Ibriham Kiswani v Aaron Cunningham*, Case No. 05 C 4559, In the United States Court for the Northern District of Illinois Eastern Division.

## LIST OF STATUTES

### Malaysian

Evidence Act 1950
Criminal Procedure Code (CPC)
Federal Constitution

### Foreign

Indian Evidence Act 1872
Criminal Procedure Code of India 1973

## LIST OF ABBREVIATIONS

| | |
|---|---|
| DNA | Deoxyribonucleic Acid |
| HKL | Hospital Kuala Lumpur |
| UMMC | University Malaya Medical Centre |
| UKMMC | University Kebangsaan Malaysia Medical Centre |
| UKMMCL | University Kebangsaan Malaysia Medical Centre Library |
| RMP | Royal Malaysian Police |
| MLJ | Malayan Law Journal |
| SASC | Southern Association of Student Council |
| CLR | Criminal Law Review |
| CLJ | Current Law Journal |
| LNS | Legal Network System |
| CPC | Criminal Procedure Code |

# CHAPTER 1

# INTRODUCTION

## 1.1 INTRODUCTION

Identification of a victim or dead bodies in forensic investigation is one of the challenging tasks to be undertaken. The outcome is very important for further legal proceeding as it reflects the effectiveness of criminal justice. The forensic case can be solved and the perpetrator can be convicted. In a criminal case involving dead bodies, various states will be discovered ranging from fresh body to completely skeletonized remains. Meanwhile, skeletal remains of the dead bodies discovered at a crime scene may present in various states, including sparse remains,[1] skull without mandibles,[2] skeletal remains from mass disaster victim,[3] and burned remains.[4]

To identify a victim or dead bodies in forensic investigation, there are 3 types of analysis of identification that is scientific and admissible in the courtroom. The analyses are deoxyribonucleic acid (DNA) analysis,[5] fingerprint analysis,[6] and dental analysis.[7] These three analyses are reliable and give a positive identification to identify a victim as it is highly

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[1] Iten, P.X., (1987). "Identification of skulls by video superimposition," *Journal of Forensic Science*, JFSCA, Vol. 32, No. 1, p. 173-188.

[2] Mandible is 'jaw bone'. See John, H.D., (2001). *"Medical Dictionary for Health Professions,"* Stedman's Concise, Illustrated 4th edition, Lippincott Williams and Wilkins, p. 589; Koelmeyer, T.D., (1982). "Videocamera superimposition and facial reconstruction as an aid to identification," *The American Journal of Forensic Medicine and Pathology*, Vol. 3, No. 1, p. 45- 48.

[3] Snow, C.C., (1980). "Victim identification in the American Airlines DC-10 accident," *American Academic Forensic Science Program*, p. 9.

[4] Noorazma, S., and Shahrom, A.W., (2007). "Identification of a charred skull: a case report," *Journal of Forensic Medicine and Toxicology*, Vol. 24, No. 2, p. 15-19.

[5] Deoxyribonucleic acid (DNA) is a genetic material of organism. DNA is inherited to us from our parents. Each individual DNA is unique with the exception of identical twins. See Inman, K., and Rudin, N. (1997). *"An introduction to forensic DNA analysis,"* CRC Press LLC, Chapter 5, p. 29.

[6] Like DNA, each individual fingerprint is unique. Even identical twins have different fingerprint. See William, J.T., Kathleen, S., and Leigh,A.C., (2006). *"Forensic Science-an encyclopedia of history, methods and techniques,"* ABC-CLIO, p. 147-148.

[7] Human teeth can fulfill the requirement of uniqueness. Human teeth can identify a person's age, gender, race, occupation, habits, and socio-economic status. See Bernstein, M., "Chapter 12: Forensic Odontology," in Eckert, W.G., (1997). *"Introduction to Forensic Science,"* 2nd edition, CRC Press.

individualistic[8] and can discriminate individuals from the other. In some cases however, these analyses may not possible or reliable due to unavailable dental report,[9] unavailable fingerprint,[10] and skeletonized human remains.[11] Sometimes, the result of the analysis can be excluded because of problems with the possible contamination of samples and technical errors.[12]

When dealing with skeletonized human remains, fingerprint analysis cannot be carried out. DNA and dental analysis are the two analyses that are survive. The source of DNA from skeletal remains for analysis is from bone[13] and teeth.[14] There are disadvantages in relation to obtaining DNA from bone and teeth. Laboratory routine for DNA analysis from bone and teeth is a tedious and time-consuming task. Apart from that, it involves strong and dangerous chemicals that may destroy the DNA sample if improperly handled.[15]

Another analysis for human identification that has come into used is skull-photo superimposition. Superimposition is a process of putting one image on top of another so that the two can be seen combined.[16] Therefore, skull-photo superimposition is a technique or analysis where image of unknown skull[17] is superimposed with an image of photograph of suspected victim by using electrical devices in an attempt to establish identity for human identification purpose. This technique is an alternative avenue to other scientific techniques (e.g. DNA, fingerprint, and dental), as the photograph of a suspected victim or dead person

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[8] Distinctive character that make something different from others. See John, H.D., (2001). *"Medical Dictionary for Health Professions,"* Stedman's Concise, Illustrated 4th edition, Lippincott Williams and Wilkins, p. 755.
[9] Not all people have their dental record.
[10] Unavailable fingerprint encountered in skeletonized human remains.
[11] The possible analysis for skeletonized human remains is DNA and dental analysis.
[12] Can be due to improper handling and care of the biological sample.
[13] Human bones contain DNA. The common part of bone for DNA extraction is femur/hip bone, ribs, and vertebrae/backbone. See Gibbon, V., (2007). "Minimally invasive human bone extraction method for DNA analysis," Intensive Course in Biological Anthropology, EAA Summer School eBook, p. 97.
[14] *Ibid.*
[15] Latham, K., & Ritke, M., (2002). "Bone DNA purification protocols for genetic analysis," University of Indianapolis Archeology & Forensics Laboratory, Rohland, E., and Holfreiter,M.,(2007). "Ancient DNA extraction from bone and teeth," *Nature protocols*, Vol. 2, No. 7, p. 1756-1762.
[16] John, H.D., (2001). *"Medical Dictionary for Health Professions,"* Stedman's Concise, Illustrated 4th edition, Lippincott Williams and Wilkins, p. 1203.
[17] Unknown skull is a skull recovered at a crime scene and the identity of the victim is unknown.

can be easily obtained from the victim's family.[18] The available photograph gives its advantages in the superimposition process as it can be manipulated as far as the superimposition concern. This technique on the other hand is not new in Forensic Anthropology as it has been in place way back in 1930's and continues up to this present time. Furthermore, the utilization of the technique has been reported in many literatures and many scientific researches have been conducted substantially. Its utility is brought to light when other avenues of identification are not possible or reliable. Like other popular scientific analysis such as DNA, dental, and fingerprint, skull-photo superimposition in a number of ways has contributed to the victim identification for further legal proceeding.



## 1.2 PROBLEM STATEMENT

Skull-photo superimposition is popular and has been successfully utilized in many western countries (e.g. United Kingdom, United States of America, Switzerland, Turkey, and Australia) and some Asian countries (e.g. India, China, and Japan). As other techniques like DNA, fingerprint analysis and dental analysis, skull-photo superimposition has been legally accepted in those countries as a means of human identification and as evidence in their court of law. The technique has not received much attention from the authorities in Malaysia. Furthermore, recent scientific techniques such as DNA, fingerprint, and dental analysis seem to have eclipsed the utilization of conventional techniques like skull-photo superimposition. In this context, the researcher explores the state of affairs relating to skull-photo superimposition as it prevails in the forensic science laboratory, medical institutions, the Malaysian Royal Police (RMP) and other related bodies in Malaysia that contribute to forensic investigations. Thus, the researcher has addressed these problems by

[18] Jayaprakash, P.T., Srinivasan, G.J., and Amravaneswaran, M.G., (2001). "Cranio-facial morphoanalysis: a new method for enhancing reliability while identifying skulls by photo superimposition," *Forensic Science International*, Vol. 117, p. 121.

investigating the present state of skull-photo superimposition in Malaysia, and has as well highlighting its legal admissibility in the court of law. Suggestions and recommendations have been offered with the objective of popularizing the implementation and utility of skull-photo superimposition as one of the techniques for human identification that can be admitted as evidence paving the way for effective administration of justice.

## 1.3 RESEARCH OBJECTIVES

1.3.1 To identify the present state of the art of skull-photo superimposition in Malaysia.

1.3.2 To discuss the admission of skull-photo superimposition evidence in the Malaysian court and make comparison with country such as India.

1.3.3 To offer suggestions and recommendations with the objective to popularize the implementation and utility of skull-photo superimposition in Malaysia.

## 1.4 METHODOLOGY

For the purpose of this research, the researcher has visited hospital, medical centers, Faculty of Dentistry, University of Malaya (UM), Chemistry Department of Malaysia, and Royal Malaysian Police (RMP) to study the present state of the art of skull-photo superimposition; whether it is utilized as a routine means for identifying unidentified human remains during forensic investigation. In that case, the researcher has gathered data and information that was useful for the research from these institutions. Hospital that the researcher has visited was Hospital Kuala Lumpur (HKL). Researcher has also visited Universiti Kebangsaan Malaysia Medical Centre (UKMMC) and University Malaya Medical Centre (UMMC).

To achieve the objectives of the research, the researcher has collected data on total number of unidentified dead bodies submitted to these institutions for the past 10 years on a year by year basis (1999-2008). From these total numbers of unidentified dead bodies, the researcher has identified the routine means of identifying those unidentified dead bodies. Besides, the researcher has also enquired and made a request to collect reported cases that have used skull-photo superimposition to identify those unidentified dead bodies. Further details of the data and information needed are as attached in Appendix (see Appendix 1 (a) at page 117).

The researcher has also visited Faculty of Dentistry, University of Malaya (UM) to identify the superimposition technique and apparatuses used for superimposition process. The researcher has also enquired and made a request to collect any reported cases that has submitted to this Faculty that used skull-photo superimposition for human identification purpose. Researcher also visited Chemistry Department of Malaysia to gather data and information on DNA-based identification using bones for the past 10 years on a year by year basis (1999-2008). Researcher has gathered reported cases requiring DNA-based identification using bones (e.g. femur and skull) and details about the cases for the past 5 years on a year by year basis. The researcher has also enquired and made a request to collect reported cases that have used skull-photo superimposition to make an individual identification, besides DNA-based identification. Further details of the data and information needed are as attached in Appendix (see Appendix 1 (b) at page 118).

Data and information pertaining to cases of reported missing person was gathered from Malaysian Royal Police (RMP) for the past 10 years on a year by year basis (1999-2008). Besides, data and information on missing persons who have been traced alive and those who still remain missing has also been collected. In addition, the researcher has identified of whether the discovered unidentified dead bodies by police was compared with the face photograph of the missing person. As to other institution, the researcher has

enquired and made a request to gather reported cases that have used skull-photo superimposition to establish identity of the discovered unidentified dead bodies from the photograph of reported missing person. Further details of the data and information needed are as attached in Appendix (see Appendix 1 (c) at page 119).

To put it in a nutshell, in this research, the researcher would like to identify if these institution have attempted skull-photo superimposition technique as an alternative for human identification, as other investigative technique may seem to limit the purpose of complete human identification. This is the issue where the researcher would like to put forward and will seek clarification in legal aspects.

To supplement the aforesaid methodological design, the researcher has made an official meeting with former police officer, Mr. Amidon Anan and Deputy Public Prosecutors, Mr. Mohamed Mustaffa b. P Kunyalam and Tuan Awang Armadajaya b. Awang Mahmud to get their views and opinions on the utility of skull-photo superimposition technique. In this regard, issue pertaining to legality of the technique, admissibility of the evidence and stumbling blocks exist (if any) in carrying out criminal justice (i.e. problems and obstacles in investigation stage etc) has been put forward.

To strengthen and support the research endeavor, the researcher has made an access to related journals, literatures, law reports, reference books and other related articles at University of Malaya library. This is accessible by visiting the library website to electronic resources at Pendeta WebPac website http://www.pendeta.um.edu.my and surfing internet for information searching. To widen the scope of information searching, the researcher has also visited Universiti Kebangsaan Malaysia Medical Centre Library (UKMMCL) to obtain more requisite information (if any) as this can assist in achieving the objectives of the research.

This is a descriptive research. Data and information was collected through interview and using appropriate questionnaires. The collected data and information was compiled and subsequently evaluated and discussed.

## 1.5 SCOPE OF RESEARCH

Skull-photo superimposition has been established in two major ways. There are videocamera superimposition,[19] and computer-assisted superimposition.[20] Each of these superimposition processes will be elaborated further on next section.



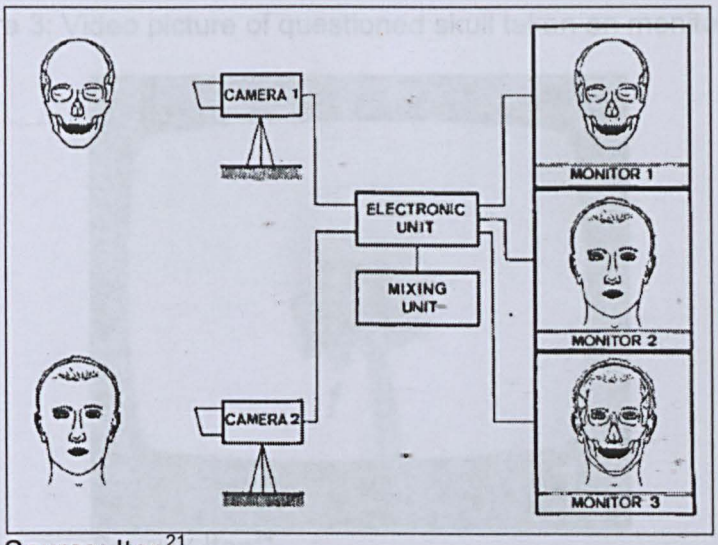
### 1.5.1 Videocamera superimposition

The common apparatus for video superimposition are two videocamera tubes, electronic and mixer units, and three monitors (Figure 1). Figure 2 shows the entire set up of the apparatus which can be found in the forensic laboratory. The function of the video tubes 1 is to take photograph of questioned skull and the image will be copied on monitor 1. While, video tube 2 is to take image of photograph of a suspected missing person and copied on monitor 2. The image of the skull and photograph of a missing person which is taken by video tube 1 and 2 respectively is superimposed to each other by a mixing unit. The mixing unit enables the two images to be compared and superimposed for identification. Apart from that, the mixing unit allows for an appreciation of a concordance between the

[19] Iten, P.X., (1987). "Identification of skulls by video superimposition," *Journal of Forensic Science*, JFSCA, Vol. 32, No. 1, p. 173-188.
[20] Yoshino, M., Matsuda, H. Kubota, S., Imaizumi, K., Miyasaka, S., and Seta, S., (1997). "Computer-assisted skull identification system using video superimposition," *Forensic Science International*, Vol. 90, p. 231-244.

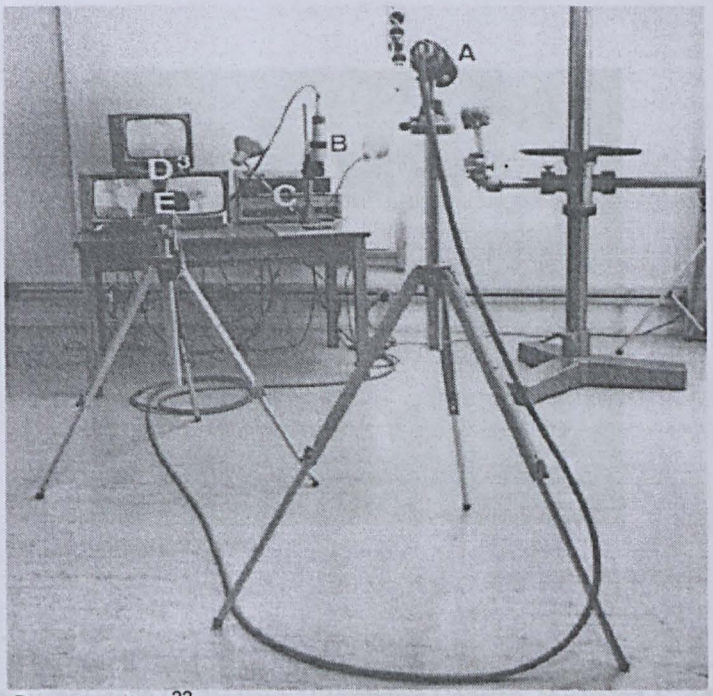
skull and photo image by way of making a horizontal and vertical sections of superimposition. Any concordance between the two images will be evaluated on monitor 3.

Figure 1: Schematic diagram of videocamera superimposition apparatus.




Source: Iten[21]

Figure 2: Videocamera superimposition set up in laboratory. Two video tubes (A and B), electronic and mixing units (C), three monitors (D), and camera (E).

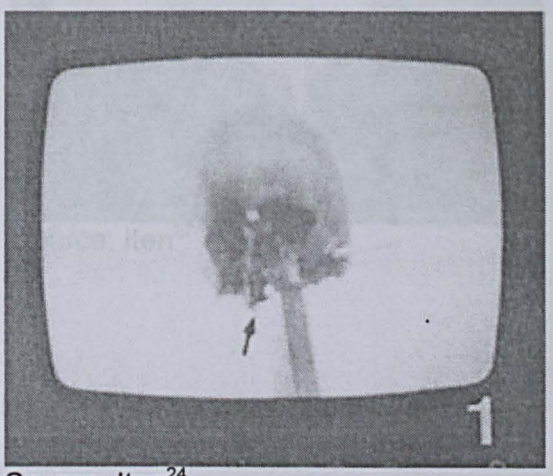



Source: Iten[22]

[21] Iten, P.X., (1987). "Identification of skulls by video superimposition," *Journal of Forensic Science*, JFSCA, Vol. 32, No. 1, p. 174.
[22] *Ibid.*, p. 177.

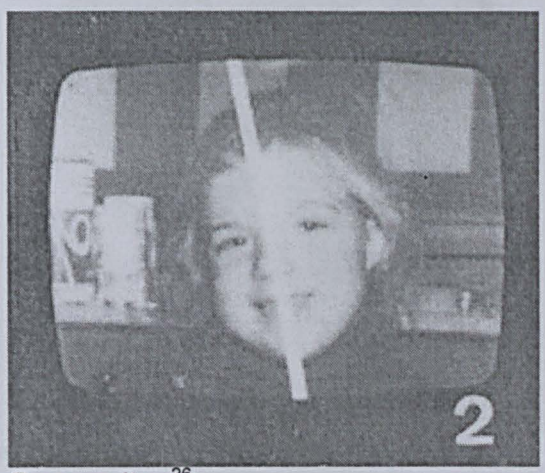
A skeletal remains of unknown child was found in a forest. The skull is taken to laboratory to be examined for identification purpose. Below is the result of video superimposition of a unknown skull with a suspected missing person.

Figure 3: Video picture of questioned skull taken on monitor 1.[23]




Source: Iten[24]

Figure 4: Video picture of the photograph of a suspected missing person taken on monitor 2.[25]




Source: Iten[26]

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[23] The axis of the skull is marked by white dots. Axis is a central line of the body or any of its part, John, H.D., (2001). *"Medical Dictionary for Health Professions,"* Stedman's Concise, Illustrated 4th edition, Lippincott Williams and Wilkins, p. 95.

[24] Iten, P.X., (1987). "Identification of skulls by video superimposition," *Journal of Forensic Science*, JFSCA, Vol. 32, No. 1, p. 178.

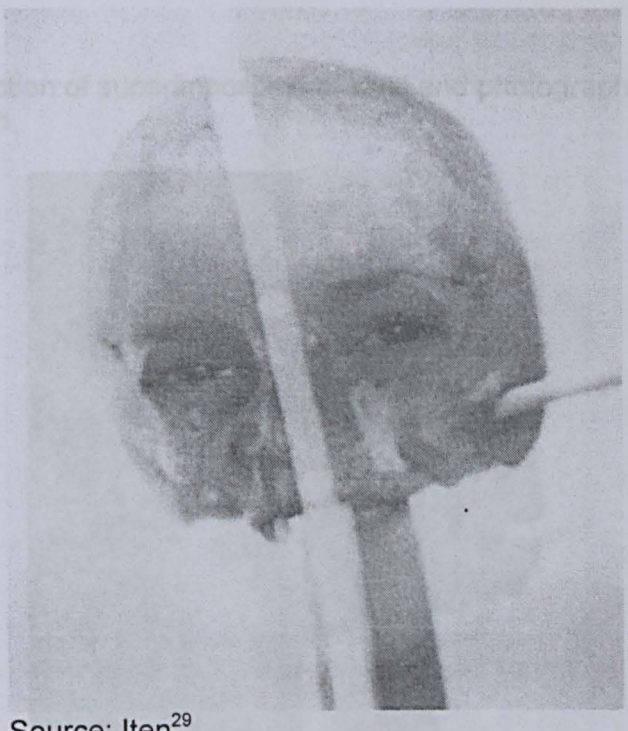
[25] The axis of the face is marked by a white line.

[26] *Ibid.*

Figure 5: The superimposed image of skull and photograph on monitor 3.


Source: Iten[27]

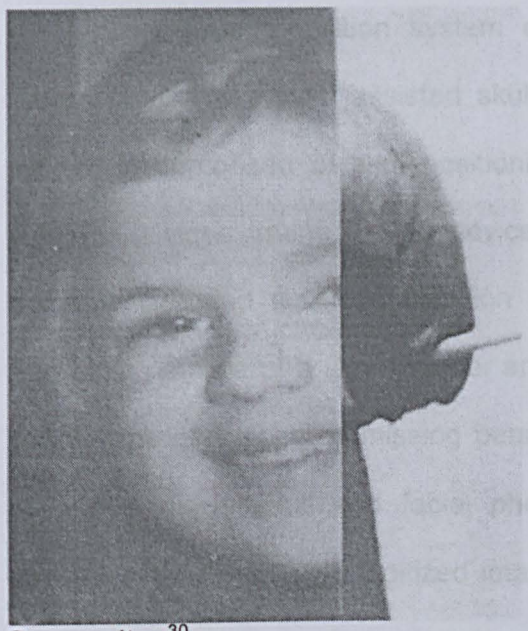
Figure 6: Another superimposed image.[28]



Source: Iten[29]

[27] *Ibid.*
[28] The skull and photograph is in concordance with each other, shown by white dots and white line.
[29] *Ibid.*, p. 179.

Figure 7: Vertical section of superimposition at the left eye region section.



Source: Iten[30]

Figure 8: Vertical section of superimposition at the right eye region section.

Source: Iten[31]

Figure 9: Vertical section of superimposition of skull and photograph at the axis shows a good match.

Source: Iten[32]

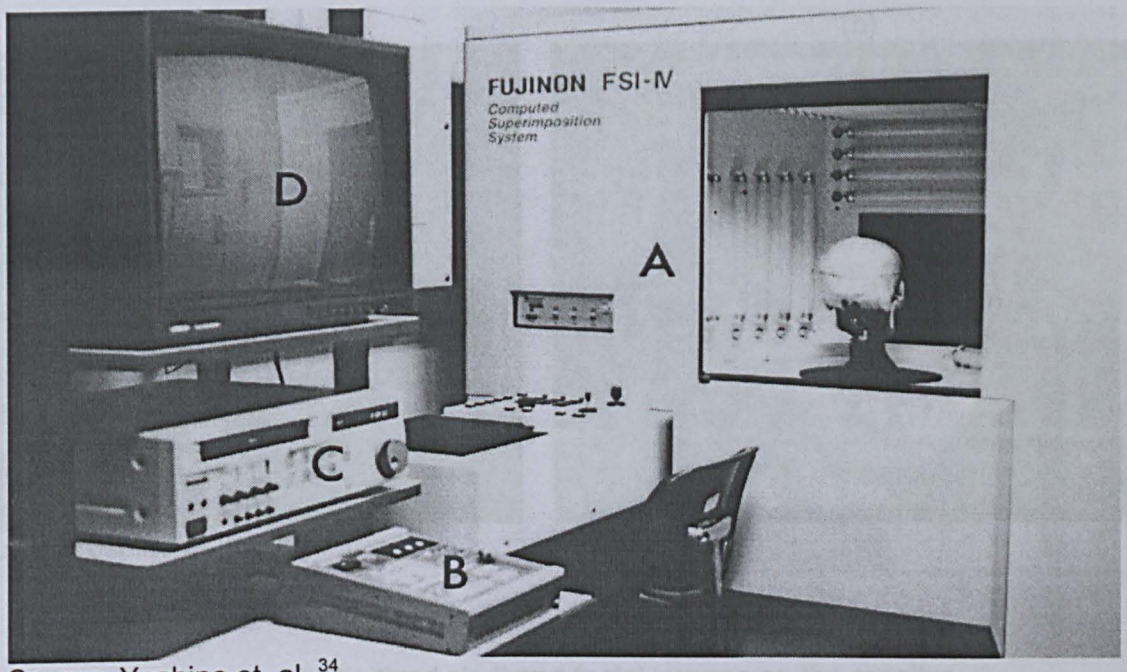
[30] *Ibid.*, p. 180.
[31] *Ibid.*, p. 181.
[32] *Ibid.*, p. 180.

### 1.5.2 Computer-assisted superimposition

This superimposition system consists of two main units, video superimposition system and a computer-assisted skull identification system. The video superimposition system is comprised of skull-positioning box having a camera, a photo-stand having a camera, a video image mixing device, a TV monitor and a videotape recorder. While, computer-assisted skull identification system is composed of a host computer including application software, a film recorder and a colour printer. In the process, the skull and the photograph of suspected missing person is superimposed by video superimposition. The produced image skull and facial photograph are later digitized and stored within the computer, and then both digitized images are superimposed by using the computer. The assessment is then carried out as to whether concordance between the skull and the photo is appear.[33]

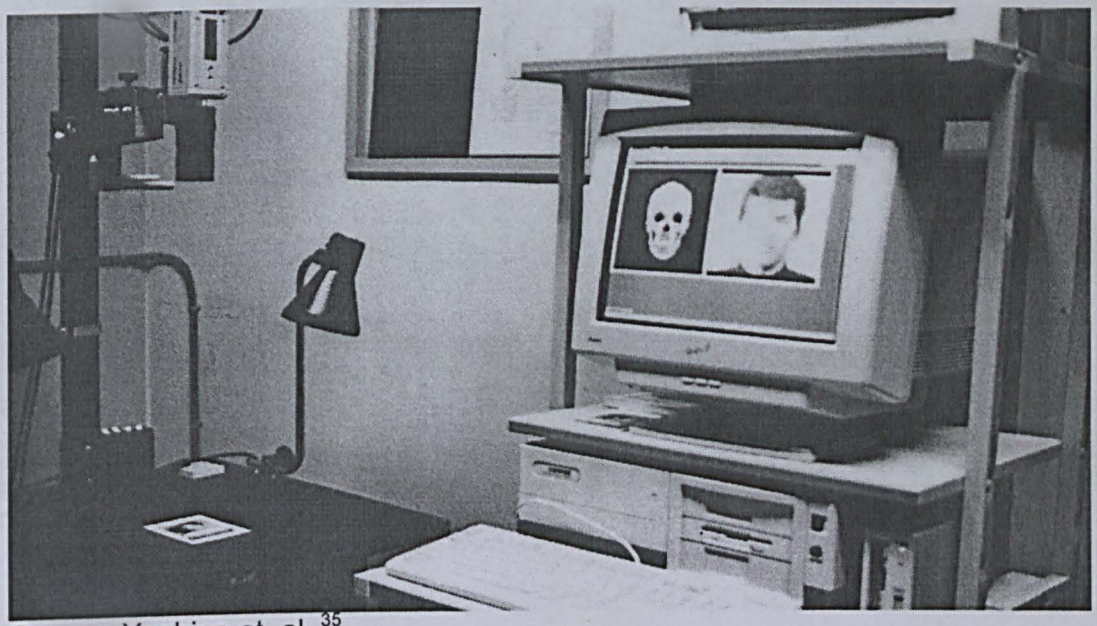
[33] Yoshino, M., Matsuda, H. Kubota, S., Imaizumi, K., Miyasaka, S., and Seta, S., (1997). "Computer-assisted skull identification system using video superimposition," *Forensic Science International*, Vol. 90, p. 231-244.

Figure 10: Video superimposition system which comprised of skull-positioning box (A), video image mixing device (B), videotape recorder (C), and color TV monitor (D).




Source: Yoshino et. al. [34]

Figure 11: The photo-stand for taking the facial photograph and the computer for identifying the skull.



Source: Yoshino et. al. [35]

[34] *Ibid.*, p. 233.
[35] *Ibid.*, p. 234.

Figure 12: (a) Video superimposition of a skull and photograph of suspected person, (b) vertical section of superimposition.


Source: Yoshino et. al. [36]

Figure 13: Digitized skull and facial images on the monitor.

Source: Yoshino et. al. [37]

[36] *Ibid.*, p. 235.

[37] *Ibid.*, p. 234-235. After the determination of the orientation and size of skull to those of the facial photograph using the video superimposition system, the skull and facial images are digitized and stored within the computer.

Figure 14: Superimposition of digitized images of skull and photograph for comparison.

Source: Yoshino et. al. [38]

Figure 15: The images of vertical and horizontal superimposition showing the positional relationships between the digitized skull and face.

Source: Yoshino et. al. [39]

[38] *Ibid.*, p. 236. The anthropometrical points and the distance between the anatomical landmarks are measured by means of pair-points with the mouse operation. Anthropometrical is concerned with comparative measurement of human body, John, H.D., (2001). *"Medical Dictionary for Health Professions,"* Stedman's Concise, Illustrated 4th edition, Lippincott Williams and Wilkins, p. 59. Thus, anthropometrical point is a point that is used for this purpose. While anatomical landmark is a standard point of the structure of the skull.

[39] *Ibid.* The wipe effect (moving sideways and up and down) facilitates the comparison of positional relationships between the digitized skull and the face.

In this research, the researcher will focus on computer-assisted superimposition. It is a popular technique and has been widely used as a means of identification and has assisted in many cases of forensic investigation. Besides, there are also lots of literatures reported on computer-assisted superimposition.

Computer-assisted superimposition is a modified technique of human skull identification. It uses a computer system as additional equipment in combination with videocamera superimposition. There are two types of operation for computer-assisted superimposition, and it is distinguished from the aspect of strategy for identification. The first one is by digitizing the skull and facial photograph and then compare the two images by image processing. The second type is by evaluating the fit and match between the skull and facial image by morphometrical examination.[40] In this context, the researcher will focus on the first strategy of superimposition.

Incorporation of computer system in the superimposition process involves a digitization of skull and facial image, and will be stored in the computer. Both digitized images are then superimposed on the monitor. There are advantages of superimposition by computer that are outweigh compared to superimposition by video technique. The digitization of the skull and facial image facilitate the assessment of anatomical consistency between the digitized skull and face. In addition, the system provides a "wiping technique"[41] to further facilitates the comparison of positional relationships between the digitized skull and the facial photograph.

Since the computer technology advances, computer-assisted superimposition has become a more popular method. The system offers a new and effective method and gives its advantages as it capable to demonstrate the anatomical consistency between skeletal

[40] Morphometrical examination is an examination of variation and change in the form (size and shape) of organisms, Yoshino, M., Matsuda, H. Kubota, S., Imaizumi, K., Miyasaka, S., and Seta, S., (1997). "Computer-assisted skull identification system using video superimposition," *Forensic Science International*, Vol. 90, p. 242.
[41] Technique whereby positioning a piece of white cardboard in front of the skull and moving it up and down or sideways to see correspondence between the skull and the face.

features and the photograph. The technique examines the superimposition process more detailed and thorough. The added computer system is more dynamic, less manpower involve, and rapid processing time. More on computer-assisted superimposition will be discussed further on next chapter.

## 1.6 LITERATURE REVIEW

This chapter illustrates the superimposition technique by means of computer. It uses computer system as additional equipment in combination with videocamera superimposition. Superimposition with computer system is a modified and advanced technique accompanied with a more holistic application which attempt to facilitate the superimposition process and thereby increase the reliability of the technique. The utility of skull-photo superimposition by computer has emerged in many literatures and has assist in human identification.

In a case study from Ohio for example, Ubelaker et. al.[42] has successfully employed the technique to identify a missing person by comparing an antemortem[43] photo with a recovered cranium[44] and mandible.[45] Human skeleton was discovered which was partially protruding from frozen ground near a group of trees in Putnam County. With the assistance of anthropologist, it was suggested that the skeleton was that of an adult female between the ages of 25 and 35 years with a height of approximately 164 cm. The photograph of the suspected victim was superimposed with the skull using the computer-assisted system.

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[42] Ubelaker, D.H., Bubniak, E., and O'Donnell, G., (1992). "Computer-assisted photographic superimposition," *Journal of Forensic Science*, JFSCA, Vol. 37, No. 3, p. 750-762.

[43] Before death. See John, H.D., (2001). *"Medical Dictionary for Health Professions,"* Stedman's Concise, Illustrated 4th edition, Lippincott Williams and Wilkins, p. 57. Thus, antemortem photograph is a photograph obtained during the life of a victim.

[44] Skull, John, H.D., (2001). *"Medical Dictionary for Health Professions,"* Stedman's Concise, Illustrated 4th edition, Lippincott Williams and Wilkins, p. 230.

[45] Mandible is 'jaw bone'. See John, H.D., (2001). *"Medical Dictionary for Health Professions,"* Stedman's Concise, Illustrated 4th edition, Lippincott Williams and Wilkins, p. 589.

With the proper orientation, the superimposition process has revealed that there is an apparent match of photograph and the underlying skeletal structure.

Another application of computer-assisted superimposition in identifying a victim has been reported by Yoshino et. al.[46] The image of the skull and photograph of the suspected person is captured by using video system. Both images are then superimposed with proper orientation, alignment and adjustment so that both images can fit with certainty. The images are then digitized and stored within the computer and are superimposed on the monitor. To measure the fitness of image of the skull and the photograph, the anatomical consistency between two digitized images were assessed. The assessment is done by measuring the distance between the skull landmarks and the flesh thickness of the facial points. While wiping technique (moving sideways and up and down) is applied to see the match of the outline between the digitized skull and photograph for comparison purpose. This application has positively identified that the skull was belonged to the suspected person.

Skull-photo superimposition has been accomplished by using 3D computer graphic system.[47] The technique is different from the aforesaid technique as it uses an additional gadget, a 3D laser scanner to capture the image of the skull. The function of 3D computer graphic system is to reconstruct a face from the skull. A discovered skeletonized remains has been identified by using this system and the application is illustrated further on next page.

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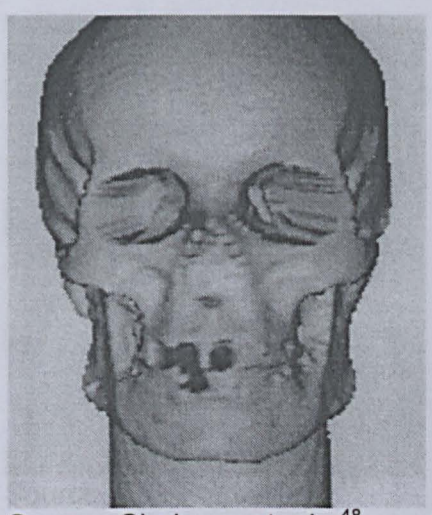
[46] See page 12-15 to see the application of this computer-assisted superimposition by the authors.

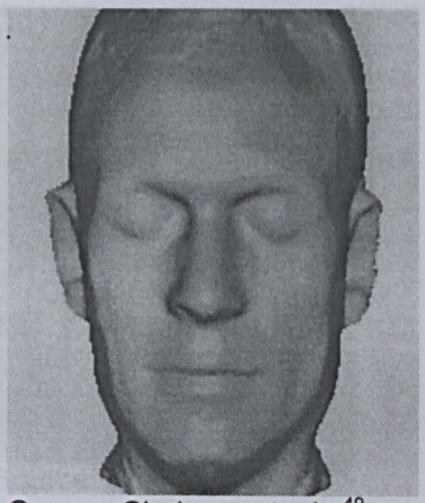
[47] Shahrom, A.W., Vanezis, P., Chapman, R.C., Gonzales, A., Blenkinsop, C., and Rossi, M.L., (1996). "Technique in facial identification: computer-aided facial reconstruction using a laser scanner and video superimposition," *Int J Legal Med*, Vol. 108, p. 194-200.

Figure 16: The image of the skull by 3D laser scanner.



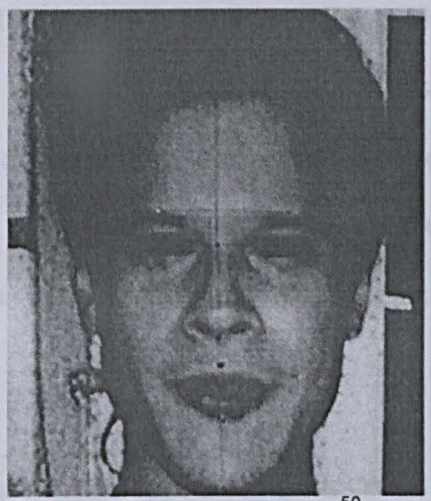
Source: Shahrom et. al., [48]

Figure 17: The reconstructed facial image from the skull.



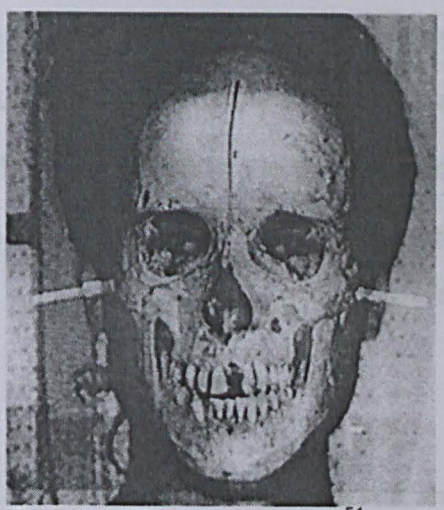
Source: Shahrom et. al., [49]

Figure 18: The photograph of suspected victim.



Source: Shahrom et. al., [50]

Figure 19: The videosuperimposition of skull and photograph.



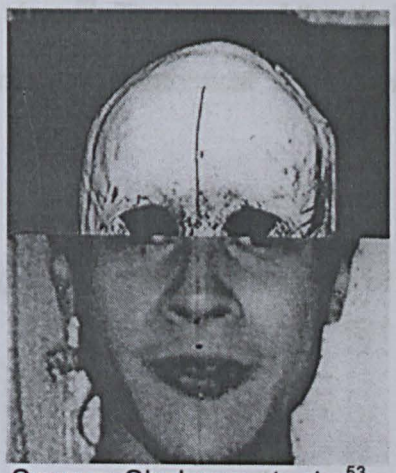
Source: Shahrom et. al., [51]

[48] *Ibid.*, p. 195.
[49] *Ibid.*, p. 196.
[50] *Ibid.*, p. 196. When compared with the constructed facial image (Figure 17), resemblances exist with the facial features of the photograph (e.g. jaw, cheek bones, and forehead) with exception to nose.
[51] *Ibid.*, p. 196. A good match existed between the superimposed photograph and the skull image.

Figure 20: Lateral wiping of superimposed image.

Source: Shahrom et. al., [52]

Figure 21: Vertical wiping of superimposed image.



Source: Shahrom et. al., [53]

Another technique of superimposition by computer system is superimposition by digital imaging. It uses the overlay function of Adobe Photoshop on a Macintosh personal computer.[54] As a routine in a computer system, the skull and the photograph of suspected person were captured and were digitized into the computer using a scanner. The digital image of the skull was layered over the digital image of the photograph in the background. In this technique, nine major anatomical points were selected and were marked on both images. The anatomical points selected were vertex,[55] nasion,[56] subnasale,[57] stomion,[58]

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[52] *Ibid.*, p. 195-196. Lateral wiping is achieved by placing a piece of white cardboard in front of the skull and moving it sideways, and showed a good match between the various landmarks of the photograph and the skull image.

[53] *Ibid.*, p. 195-197. Vertical wiping is achieved by placing a piece of white cardboard in front of the skull and moving it up and down, and showed a good match between the various landmarks of the photograph and the skull image.

[54] Matsui, K. (2001). "Digital Imaging in Forensic Medicine," Department of Forensic Medicine, Osaka Medical College, p. 73-76.

[55] The topmost point of the vault of the skull. See John, H.D., (2001). *"Medical Dictionary for Health Professions,"* Stedman's Concise, Illustrated 4th edition, Lippincott Williams and Wilkins, p. 1052.

[56] A point on the skull corresponding to the middle of the nasofrontal suture. Nasofrontal is relating to the nose and forehead. Suture is a joint where two bones united. See John, H.D., (2001). *"Medical Dictionary for Health Professions,"* Stedman's Concise, Illustrated 4th edition, Lippincott Williams and Wilkins, p. 657, 658, 960.

[57] *Ibid.*, p. 949. The point of the angle between the septum/wall of the nose and the surface of upper lip.

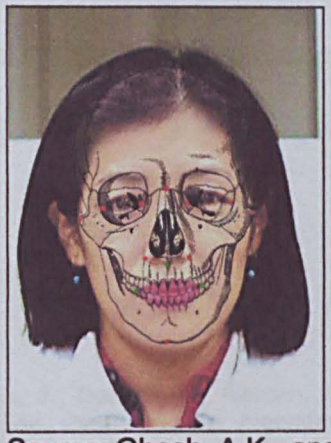
[58] Stomion is the midpoint of the horizontal labial (lip) fissure. When the lips are not closed in the rest position, stomion is a constructed point defined as the midpoint of the interlabial gap. See Swennen, G.R.J., "3D Cephalometric soft tissue landmarks," Chapter 5, p. 213.

gnathion,[59] zygion,[60] endocanthion,[61] exocanthion,[62] and alare.[63] The image of the skull was then superimposed with the image of photograph and the anatomical consistency is examined.

Figure 22: Digital image of the skull was layered photograph over the digital image of the photograph in the background.

Source: Ghosh, A.K., and Sinha, P.[64]

Figure 23: Anatomical point of photograph and the skull were superimposed and examined for its consistency.



Source: Ghosh, A.K., and Sinha, P.[65]

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[59] The most inferior point of the mandible/jaw in the midline. See John, H.D., (2001). *"Medical Dictionary for Health Professions,"* Stedman's Concise, Illustrated 4th edition, Lippincott Williams and Wilkins, p. 408.

[60] Zygion is the most lateral point on the soft tissue contour of each zygomatic (cheek) arch. See Swennen, G.R.J., "3D Cephalometric soft tissue landmarks," Chapter 5, p. 196.

[61] Endocanthion is the soft tissue point located at the inner corner of each eye fissure. See Swennen, G.R.J., "3D Cephalometric soft tissue landmarks," Chapter 5, p. 191.

[62] Exocanthion (ex) is the soft tissue point located at the outer corner of each eye fissure. See Swennen, G.R.J., "3D Cephalometric soft tissue landmarks," Chapter 5, p. 192.

[63] Most lateral point on each alar/ear contour. See Swennen, G.R.J., "3D Cephalometric soft tissue landmarks," Chapter 5, p. 203.

[64] Matsui, K. (2001). "Digital Imaging in Forensic Medicine," Department of Forensic Medicine, Osaka Medical College, p. 75.

[65] *Ibid.*

Currently, superimposition technique has developed into a new level of advancement. These include superimposition by using genetic algorithm,[66] and Extended Symmetry Perceiving Adaptive Neuronet (ESPAN).[67] Superimposition by using genetic algorithm for example, based on the use of real-coded genetic algorithm for the alignment of the 3D skull model with the 2D face photo. Genetic algorithm, proposed by Nickerson et. al.,[68] is a search techniques based on the mechanisms of natural genetics and selection. This automatic technique attempts to find the best overlaying between the virtual model of the skull and the 2D photo of the missing person.

Steps in superimposition by using genetic algorithm are include, i) 2D digitalization of an antemortem facial photograph and 3D digitalization of the surface mesh of the skull by digital camera and scanner, ii) application of digital filtering techniques to both models to reduce or eliminate systematic error, iii) selection of four landmark points on the digital facial image (e.g. glabella,[69] two ectocanthion point,[70] and subnasal point[71]) and four equivalent landmarks on the skull surface mesh, iv) calculation of the near-optimal affine and perspective transformations required to map the skull surface mesh into two dimensions and onto the face, and finally rendering the digital facial photograph and transformed skull surface mesh for visual analysis by computer graphic technique.[72]

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[66] Ballerini, L., Cordon, O., Santamaria, J., Damas, S., Aleman, I., and Botella, M., (2007). "Craniofacial Superimposition in Forensic Identification using Genetic Algorithms," Third International Symposium on Information Assurance and Security, IEE Computer Society, p. 429-434.

[67] Ghosh, A.K., and Sinha, P., (2001). "An economized craniofacial identification system," *Forensic Science International*, Vol. 117, p. 109-119.

[68] T. Back, D. B. Fogel, and Z. Michalewicz, editors. *Handbook of evolutionary computation.* IOP Publishing Ltd and Oxford University Press, 1997, as cited in Ballerini, L., Cordon, O., Santamaria, J., Damas, S., Aleman, I., and Botella, M., (2007). "Craniofacial Superimposition in Forensic Identification using Genetic Algorithms," Third International Symposium on Information Assurance and Security, IEE Computer Society, p. 431.

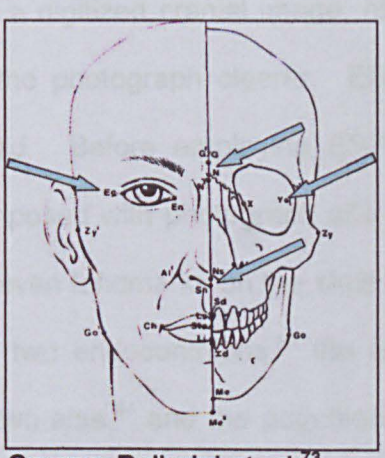
[69] The most forward projecting point of the forehead in the midline. See John, H.D., (2001). *"Medical Dictionary for Health Professions,"* Stedman's Concise, Illustrated 4th edition, Lippincott Williams and Wilkins, p. 400.

[70] See Note 62, at page 21.

[71] The point of the angle between septum/partition of the nose and the surface of the upper lip. See John, H.D., (2001). *"Medical Dictionary for Health Professions,"* Stedman's Concise, Illustrated 4th edition, Lippincott Williams and Wilkins, p. 949.

[72] See Note 67.

Figure 24: Landmarks (arrows indicate the selected ones)



Source: Ballerini et. al.[73]

This new technique of superimposition involves an automatic calculation of the mapping of the skull surface mesh on the digital facial photograph. This mapping was achieved from the matching of the four landmarks (Figure 25) both in the face and the skull.[74] According to the authors, this technique is time consuming.[75] However, the process is fast and accurate.[76]

Figure 25: Result of superimposition by genetic algorithm in the real case.

Source: Ballerini et. al.[77]

[73] Ballerini, L., Cordon, O., Santamaria, J., Damas, S., Aleman, I., and Botella, M., (2007). "Craniofacial Superimposition in Forensic Identification using Genetic Algorithms," Third International Symposium on Information Assurance and Security, IEE Computer Society, p. 431.
[74] *Ibid.*
[75] *Ibid.*, p. 429.
[76] *Ibid.*, p. 434.
[77] *Ibid.*

Extended Symmetry Perceiving Adaptive Neuronet (ESPAN)[78] is another new technique of superimposition. Special features of this technique include the technique does not need any reconstruction of a digitized cranial image, examine only front view of facial image, and capable to make the photograph clearer. ESPAN has been employed in a murder case of a missing child. Before employing ESPAN for identification, the skull discovered was initially superimposed with photograph of a suspected child by using video superimposition. In ESPAN, eleven landmarks on the skull were selected in this technique. They are two ectoconthions,[79] two endoconthions,[80] the nasion,[81] the nasospinale,[82] two points of malar prominence,[83] two alae,[84] and the pogonion[85] and all the eleven landmarks were associated with the face photograph. Superimposition revealed that almost exact matching exhibited between the landmarks and the facial photograph. ESPAN confirmed that the skull belonged to the missing child.

The above-illustrated reviews are superimposition technique by computers that have been employed to assist in the establishing of human identity. It showed that identification can be made using superimposition process especially when no other avenues of human identification are possible and available. The advanced technique of superimposition has increasing and is now more accurate than ever before and have aided in many forensic cases.

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[78] See Note 67, at page 22.
[79] See Note 62, at page 21.
[80] See Note 61, at page 21.
[81] A point on the skull corresponding to the middle of the nasofrontal suture. Nasofrontal is relating to the nose and forehead. Suture is a joint where two bones united. See John, H.D., (2001). *"Medical Dictionary for Health Professions,"* Stedman's Concise, Illustrated 4th edition, Lippincott Williams and Wilkins, p. 657, 658, 960.
[82] Naso is the nose, while spinal relates to any spine. See John, H.D., (2001). *"Medical Dictionary for Health Professions,"* Stedman's Concise, Illustrated 4th edition, Lippincott Williams and Wilkins, p. 657 and 922. Thus nasospinal is spinal of a nose.
[83] Relating to cheek or cheekbone. See John, H.D., (2001). *"Medical Dictionary for Health Professions,"* Stedman's Concise, Illustrated 4th edition, Lippincott Williams and Wilkins, p. 586.
[84] Wing of a nose. See John, H.D., (2001). *"Medical Dictionary for Health Professions,"* Stedman's Concise, Illustrated 4th edition, Lippincott Williams and Wilkins, p. 29.
[85] The most anterior/front surface, prominent point on the chin. See John, H.D., (2001). *"Medical Dictionary for Health Professions,"* Stedman's Concise, Illustrated 4th edition, Lippincott Williams and Wilkins, p. 778.

## 1.7 RESEARCH LIMITATIONS

Throughout the research endeavor, researcher faced some setbacks and drawbacks that affect the research continuity and thereby limiting the objective of the research undertaking that may be evident in this research. The limitations encountered throughout this research undertaking are enumerated below.

### 1.7.1 Limited academic references

One of the significant setbacks was limited access to journals, books, and other articles pertaining to the research topic. These sources were strongly needed by researcher for references and for further supportive academics references. Some important articles were failed to be downloaded as it is restricted to only permitted authorization. Apart from that, not all requisite journals were accessible in the University of Malaya campus.

To overcome these limitations, the researcher has obtained indirect sources through interviews with medical practitioners, polices, and lawyers. Apart from that, the researcher made a visit to University Kebangsaan Malaysia Medical Centre Library (UMMCL) to search for additional journals, books and other related articles for the research conducted.

### 1.7.2 Limited data and information

One of the most significant limitations and challenges in this research was gaining access to data and information from related institutions. Data and information required from Malaysian Royal Police, hospital, medical centers and Chemistry Department of Malaysia were classified. The researcher was only permitted to collect a limited number of data and information. In addition, a problem was also encountered while collecting data, for instance,

unavailable record, incomplete information, and poor management (e.g. unreplied letter, cold welcome). The researcher has to adhere to the right procedure especially when dealing with personnel of very high rank and to obtain the required data and information. Besides, researcher must do follow up from time to time in order to ensure smooth passage of the research endeavor.

Data and information collection from University Kebangsaan Malaysia Medical Centre (UKMMC) and Chemistry Department of Malaysia cannot be accomplished as it was classified. Data collection on DNA-based identification from bones including the details of the case was not permitted by Chemistry Department of Malaysia. In view of this problem, as an alternative, the researcher has referred this matter to University Malaya Medical Centers, but however, similar problem occurred. The case details were confidential and the researcher was not allowed to have an access of the case. The progress of this research was somehow thwarted by these kinds of unavoidable limitations. To minimize the limitation that appear in this research, the researcher has interviewed the pathologist and other staffs to obtain the necessary information.

### 1.7.3 Scope of data collection

Another limitation of this research was the scope of data and information collection. Resource collection can be executed from all related institutions throughout countries in Malaysia, such as Johor, Kelantan, and Terengganu. Due to the time constraint, the researcher has to limit the resource collection from institutions inside Wilayah Persekutuan and Selangor.

## CHAPTER 2

## SKULL-PHOTO SUPERIMPOSITION: AN OVERVIEW

### 2.1 INTRODUCTION

Superimposition means "to put one image on top of another so that the two can be seen combined."[1] Thus, skull-photo superimposition is an identification technique where unknown skull[2] is superimposed with photograph of a suspected victim, and the examination of the two will be assessed in combination by observing the concordance between the skull and the photograph. Skull-photo superimposition has become the most frequently used identification technique in many parts of a country such as India,[3] Turkey,[4] Australia,[5] Switzerland,[6] New Zealand,[7] America,[8] Germany,[9] China,[10] and Japan.[11]

In fact, skull-photo superimposition has been legally accepted as a means of human identification and the evidence is admissible in their court of law. It could be taken as

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[1] *Oxford Advanced Learner's Dictionary of Current English*, 6th edition, Oxford University Press, p. 1203.
[2] Skull recovered at a crime scene and the identity is not known.
[3] Sen, N.K., (1962). "Identification by superimposition photographs," *Int. Criminal Police Review*, No. 162, p. 284-286; Gupta, S.R., (1969). "The superimposition technique in the identification of unknown skulls," *Journal of the Indian Academy of Forensic Science*, Vol. 8, No. 1, p. 33-38.
[4] Iscan, M.Y., and Olivera, H.E.S., (2000). "Forensic Anthropology in Latin America," *Forensic Science International*, Vol. 109, p. 15-30; Solla, H.E., and Iscan, M.Y., (2001). "Skeletal remains of Dr. Eugenio Antonio BerrõÂos Sagredo," *Forensic Science International,* Vol. 116, p. 201-211; Iscan, M.Y., Solla, H.E., and McCabe, B.Q., (2005). "Victim of a dictatorial regime: Identification of Mr. Roberto Gomensoro Josman," *Forensic Science International*, Vol. 151, p. 213–220.
[5] Bastian, R.J., Dalitz, G.D., and Woodward, C., (1986). "Video superimposition of skulls and photographic portraits-a new aid in identification," *Journal of Forensic Science*, Vol. 31, No. 4, p. 1373-1377.
[6] Iten, P.X., (1987). "Identification of skulls by video superimposition," *Journal of Forensic Science*, JFSCA, Vol. 32, No. 1, p. 173-188.
[7] Koelmeyer, T.D., (1982). "Videocamera superimposition and facial reconstruction as an aid to identification," *The American Journal of Forensic Medicine and Pathology*, Vol. 3, No. 1, p. 45- 48.
[8] Ubelaker, D.H., Bubniak, E., and O'Donnell, G., (1992). "Computer-assisted photographic superimposition," *Journal of Forensic Science*, JFSCA, Vol. 37, No. 3, p.750-762.
[9] Helmer, R.P., (1987). "Identification of the cadaver remains of Josef Mengele," *Journal of Forensic Science,* Vol. 32, No. 6, p. 1622-1644.
[10] Chai, D.S., Lan, Y.W., Tao, C., Gui, R.J., Mu, Y.C., Feng, J.H., Wang, W.D., and Zhu, J., (1989). "A study on the standard for forensic anthropologic identification of skull-image superimposition," *Journal of Forensic Science*, Vol. 34, No. 6, p. 1343-1356.
[11] Suzuki, T., (1973). "Reconstitution of a skull," *Int. Crim. Police Review*, Vol. 264, p. 76-80; Yoshino, M., Imaizumi, K., Miyasaka, S., and Seta, S., (1995). "Evaluation of anatomical consistency in cranio-facial superimposition images," *Forensic Science International*, 74, p. 125-134; Yoshino, M., Matsuda, H., Kubota, S., Imaizumi, K., Miyasaka, S., and Seta, S., (1997). "Computer-assisted skull identification system using video superimposition," *Forensic Science International,* Vol. 90, p. 231–244; Hiroyuki, M., Toshio,M., Takayoshi, A., Hideki, N., Shin-ichi, N., and Koji, I., (1998). "The Cranio-Facial Superimposition Technique Using Personal Computer," *Japanese Journal of Science and Technology for Identification,* Vol. 3, No. 2, p. 57 – 62.

corroborative evidence[12] and may serve as partial corroboration[13] to establish identity, and a number of cases have been successfully tackled using skull-photo superimposition. Sen[14] suggested that the technique would help place identification beyond doubt.

By history, the early use of the skull-photo superimposition was reported to be established by Professor Brash of the University of Edinburg in 1935 in the case of famous British trial of Buck Ruxton in England.[15] The case was of a landmark case and subsequently, the technique has as well been employed in a number of other prominent cases such as identification of Joseph Mengele,[16] Dobkin case of England (1943), Plumbago Pit case (1947), and Lebries murder case of Canada (1955).[17] The utility of skull-photo superimposition was becoming popular and captured the attention of other scientist to adopt the technique. Ever since, skull-photo superimposition has become the most frequently used for identifying skull in many parts of a country.

Establishment of identity of dead bodies is made easier if the complete skeletal remains discovered. The absence of one or more skeletal parts may hinder identity establishment of a dead person. When complete skeletal remains discovered, the examination of the skull is a crucial part as it can reveal characteristics of an individuals to assist in the identification process.[18] In forensic investigation for example, skull can be used to reconstruct the face of the suspected dead person. Thus, skull-photo superimposition is

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[12] Koelmeyer, T.D., (1982). "Videocamera superimposition and facial reconstruction as an aid to identification," *The American Journal of Forensic Medicine and Pathology*, Vol. 3, No. 1, p. 45.
[13] Gupta, S.R., (1969). "The superimposition technique in the identification of unknown skulls," Journal of the Indian Academy *of Forensic Science*, Vol. 8, No. 1, p. 33-38, as cited in Ubelaker, D.H., Bubniak, E., and O'Donnell, G., (1992). "Computer-assisted photographic superimposition," *Journal of Forensic Science*, JFSCA, Vol. 37, No. 3, p.751.
[14] Sen, N.K., (1962). "Identification by superimposition photographs," *Int. Criminal Police Review*, No. 162, p. 286.
[15] Banarjee, A., (1964). "Camera identifies human skull," *The Indian Police Journal*, Vol. XI, No.2, p. 44; Sen, N.K., (1962). "Identification by superimposed photographs," *International Criminal Police Review*, No. 162, p. 284.
[16] Helmer, R.P., (1987). "Identification of the cadaver remains of Josef Mengele," *Journal of Forensic Science*, Vol. 32, No. 6, p. 1622-1644.
[17] See Note 15.
[18] Iscan, M.Y., and Helmer, R.P., (1993). "*Forensic Analysis of the Skull*," Wiley Liss: New York, p. 258.

a reconstruction[19] process as it attempts to establish correlation between the two for the purpose of identification and recognition. Good concordance and correlation between the superimposed skull and photograph of a suspected dead person can establish the identity of the dead person, thus it is reconstructive. Reconstruction is one of the investigation processes in forensic investigation. It attempts to portray the situation back to the how it was before. As mentioned by Aulsebrook et. al.,[20]

> Two-dimensional superimposition techniques are considered to be reconstructions in that they attempt to supply a face for a found skull. This is accomplished by comparison and matching of two already existent images, one of the skull and the other of a face that is thought to belong to the owner of the skull. An attempt is made to establish a close enough correlation between the images to state with a reasonable degree of confidence that both belong to the same individual.

Apart from that, human skull provides demographic information of the individual. There have been lots of existing studies on sex determination from skull. For example, skull can determine sex as male skull and female skull have different characteristics. Usually naked eye observation is applied to determine sex from the skull. Generally, male skull is more in length and breath than the female skull,[21] while female skull is more narrow and shorter than the male skull.[22] On the other hand, male and female skull can be differentiated from the frontal bone and mandible. Usually in male, the frontal bone slopes back slightly, while female frontal bone rises vertically.[23] Meanwhile, male mandible is larger and squarer compared to female.[24] Apart from sex determination, human skull can provide information on age estimation and racial origin.[25] Krogman and Iscan emphasized that determination of

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[19] The process of putting something back into the state it was in before. See *"Advanced Learner's Dictionary, Oxford,"* 6th edition, p. 977.
[20] Aulsebrook, W.A., Iscan, M.Y., Slabbert, J.H., and Becker, P., (1995). "Superimposition and reconstruction in forensic facial identification: a survey," *Forensic Science International*, Vol. 75, p. 102.
[21] Suazo, G. I. C., Zavando, M. D. A. and Smith, R. L. (2008). "Accuracy of palate shape as sex indicator in human skull with maxillary teeth loss." *Int. J. Morphol.*, Vol. 26, No. 4, p. 990.
[22] *Ibid.*
[23] See Note 21, p. 989. Frontal bone refers to bone of forehead.
[24] *Ibid.*, Mandible refer to chin bone.
[25] Krogman, W.M., and Iscan, M.Y., (1986). "*The human skeleton in forensic medicine.*" 2nd edition, Springfield, Thomas, as cited in Paiva, L.A.S., and Segre, M. (2003). "Sexing the human skull through the mastoid process," *Rev Hosp Clin Fac Med S Paulo,* Vol. 58, No. 1, p. 16.

sex, age, and race from skull can reach a level of reliability of 92%.[26] This information from skull can narrow down and facilitate further investigation of whom the skull belongs to.

A number of approaches of superimposition techniques have been produced and developed by many different scholars. Apart from that, superimposition technique from time to time undergone a transformation and renovation, and some scholars have offered a new modification to the technique to a more improved and better technique to further facilitate the superimposition process. This is evident in many literatures and research undertaking.

## 2.2 THE CHRONICLES OF SKULL-PHOTO SUPERIMPOSITION

Superimposition of skull with that of the photograph of presumed victim has been chronicled in many literatures. This sub paragraph seeks to sets out a review work done so far on superimposition which was formerly started from a simple superimposition set-up to a more advanced one. In retrospect, the idea of using skull and photograph for the purpose of human identification was first suggested by Professor Brash in 1935.[27] This is following with the idea that photograph of a missing person can be superimposed with the skull as an identification technique.[28] Professor Brash has used this technique in the identification of a murdered, Isabelle Ruxton and Mary Rogerson, which finally convict the husband, Mr. Ruxton.[29] This novel method of superimposition has later open the eyes of other scientist to use the same approach to solve their criminal cases. They include Webster in the

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[26] *Ibid.*

[27] Glaister, J., and Brash, J.C. Medicolegal aspect of Buck Ruxton case (1937), as cited in Sekharan, P., (1971). "A revised superimposition technique for identification of the individual from the skull and photograph," *The Journal of Criminal Law, Criminology, and Police Science*, Vol. 62, No. 1, p. 107.

[28] *Ibid.*

[29] Ubelaker, D.H., Bubniak, E., and O'Donnell, G., (1992). "Computer-assisted photographic superimposition," *Journal of Forensic Science,* JFSCA, Vol. 37, No. 3, p.751.

Plumbago Pit case,[30] Basauri in the Corn field crime case of Peru,[31] Simpson in Dobkin case of England[32] and by Prinsloo.[33] The technique generally described as follows:[34]

> From the original photograph a negative retake is made. The original photograph may be a bust, a full length photo of the individual or a group photograph. In any case only the face is reproduced on the negative of definite format. The skull is then placed on a tripod, and its position is adjusted exactly to that of the face in the photograph. It is then focused on the ground glass at the same format. The reproduced negative is placed on the ground glass and the image of the skull is adjusted to superimpose on the negative and then photographed. The adjustment is made by drawing an outline of the face or by marking the prominent anatomical points of the face on the ground glass. Finally the two negatives are superimposed to give a positive print. Then the photograph is enlarged and points that are coinciding are noted and opinion given.

However, this technique has its weaknesses. The technique has been criticized as not being scientific.[35] One may wonder what would be the science explanation behind it as it deals with superimposing the image of skull with the image of facial photograph. Apart from that, it is also argued that there is a possibility that the skull can fit and match with a photograph of a different person.[36] These very obvious flaws in superimposition technique have compelled some scholars to contribute their piece of work to enhance the betterment of the technique as well as eliminate the existing flaw of the technique.

Sekharan[37] established a modified superimposition technique in an attempt to produce a more convincing outcome. The technique by Sekharan described as follows:[38]

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[30] Webster, G., 28 Police J. 185 (1955), as cited in Sekharan, P., (1971). "A revised superimposition technique for identification of the individual from the skull and photograph," *The Journal of Criminal Law, Criminology, and Police Science*, Vol. 62, No. 1, p. 107.
[31] Basauri, C., (1967). "A body identified by Forensic Odontology and superimposed photograph," *Int. Criminal Police Review*, 204, p. 37-43.
[32] Simpson, K., (1943). "*Rex v Dobkin*: The baptist church cellar murder," *Medico-legal and Criminological Review,* Vol.11, p. 132-145, as cited in Ubelaker, D.H., Bubniak, E., and O'Donnell, G., (1992). "Computer-assisted photographic superimposition," *Journal of Forensic Science*, JFSCA, Vol. 37, No. 3, p.751.
[33] Prinsloo, I., (1953). "The identification of skeletal remains in Regina versus K and another the Howick Falls murder case," *Journal of Forensic Medicine*, Vol.1, No. 1, p.11-17, as cited in Ubelaker, D.H., Bubniak, E., and O'Donnell, G., (1992). "Computer-assisted photographic superimposition," *Journal of Forensic Science*, JFSCA, Vol. 37, No. 3, p.751.
[34] Sekharan, P., (1971). "A revised superimposition technique for identification of the individual from the skull and photograph," *The Journal of Criminal Law, Criminology, and Police Science*, Vol. 62, No. 1, p. 107.
[35] *Ibid.*
[36] *Ibid.*
[37] *Ibid.*, p. 107-113.
[38] *Ibid.*, p. 107-108.

The face of the individual in the photograph has to be enlarged to life size. This is possible if any of the articles such as the shirts, spectacles, the chair, saree, etc found in the photograph can be obtained and brought to the laboratory. If, for example, the shirt worn by the individual is available, the distance between the two button holes (that appear in the photograph) can be measured and from this distance, the required magnification of the negative retake to make a life size photo can be worked out. When these distances are measured it is very essential to select the distances that are involved in linear magnification only. The shirt, the face of the individual, etc, can be considered to be in the same plane taking into account the distances involved between the camera and the individual when the original photograph was made. Thus a life size face is reproduced in a diapositive film. Then the skull is set in a universal skull rest, and its position can be adjusted exactly in the same way the face is seen in the photo, say, straight or oblique, slightly oblique or raised or lowered turn towards, left or right and so on. In this position, the skull is photographed with a scale and a life size 1:1 enlargement of the skull is obtained in another diapositive film. These two diapositives are then placed on over the other and viewed in a viewing lobby. An x-ray viewing lobby is well suited for this purpose. When a correct superimposed position is attained both the diapositives can be fixed by adhesive tapes. Then a print can be made on a photographic paper or film using these two superimposed diapositives. From this superimposed negative further enlargement can be made. These enlargements can be studied for points of similarity as usual.

In short, Sekharan used an object in the photograph which is used as a scale in the production of a life size face. From the submitted case at that time, Sekharan used chair and saree in the separate photograph of suspected victim to produce a life size face.[39] The idea of using an object in the photograph was later adopted by other scientist and they are Gordon and Drennan which used tie,[40] Mckenna et. al. which used teeth,[41] and Loh et.al. which used interpupil distance of another person in the photograph.[42]

As skull-photo superimposition received a wide acceptance, some scientists have offered a new modification. Helmer and Gruner introduced a superimposition technique

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[39] *Ibid.*, p. 107-113.

[40] Gordon, I., and Drennan, M.R., (1948). "Medico-legal aspects of the Wolkersdorfer case," South African Medical Journal, p. 543-549, as cited in Ubelaker, D.H., Bubniak, E., and O'Donnell, G., (1992). "Computer-assisted photographic superimposition," *Journal of Forensic Science*, JFSCA, Vol. 37, No. 3, p.751.

[41] McKenna, J., Jablonski, N., and Fearnhead, R., (1984). "A method of matching skulls with photographic portraits using landmarks and measurement of dentition," *Journal of Forensic Science*, Vol. 29, No. 3, p. 787-797.

[42] Loh, F.C., and Chao, T.C., (1989). "Skull and photographic superimposition: a new approach using a second party's interpupil distance to extrapolate the magnification factor," *Journal of Forensic Science*, Vol. 34, No. 3, p. 708-713, as cited in Ubelaker, D.H., Bubniak, E., and O'Donnell, G., (1992). "Computer-assisted photographic superimposition," *Journal of Forensic Science*, JFSCA, Vol. 37, No. 3, p.751.

which involves the use of two video camera, an electronic mixing, and a viewing screen.[43] This was later utilized by many other scientists. Bastian et. al.,[44] for example used video equipment to enlarge antemortem photograph and then superimposed it on the video picture of the skull of the suspected dead person person. The application is as follows:[45]

> The skull is mounted on an adjustable support allowing movement in three planes. A Hitachi GP-5 Color Video Camera or its equivalent is firmly mounted on a tripod, aligned at right angles to the antemortem photograph. The centre of the lens should be at the same level as the horizontal centre of the photograph. The mounted skull is located in front of a contrasting background and a second video camera is aligned to the skull in the same manner as the first camera to the photograph. Both cameras are then 'white' balanced in accordance to the source of illumination. The individual video signals from each camera are fed into a vision mixer so that a variety of functions, for example, horizontal and vertical wiping and superimposition and negative simulation, can be performed. Color is introduced to provide a warmer visual acceptance and create more easily distinguishable highlights. Color will reduce the effect of highlights and provide a warmer visual image. The introduction of gelatin filters over the light source illuminating the skull produces warmer visual image than a noncolored illumination. The skull is oriented, on the adjustable mount, as closely as possible to the angulation of the head of the subject in the antemortem photograph. The video pictures from both cameras are relayed into a Viscount 1107 Video Mixer. By adjusting the mixer, the video picture of the antemortem photograph can be enlarged.

This video technique by those scientist offers a better and reliable application accompanied with a handy electrical devices. Video mixer for example, allows a comparison between the skull and photograph to be made easier and fast. Video mixer also enables the two images to be adjusted at a required position for assessments of fit and match. In addition, it provides a 'fade-out'[46] and 'sweep'[47] facilities where the image of the skull can be superimposed with the photograph in both vertical and horizontal sections.

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[43] Helmer, R., and Gruner, O., (1976). „Vereinfachte schadelidentifizierung nach dem superprojektions-verfahren mit Hilfe einer video-anlage," *Forensic Science*, Vol. 7, No. 3, p. 202, as cited in Ubelaker, D.H., Bubniak, E., and O'Donnell, G., (1992). "Computer-assisted photographic superimposition," *Journal of Forensic Science*, JFSCA, Vol. 37, No. 3, p.751.

[44] Bastian, R.J., Dalitz, G.D., and Woodward, C., (1986). "Video superimposition of skulls and photographic portraits-a new aid in identification," *Journal of Forensic Science*, Vol. 31, No. 4, p. 1373-1377.

[45] *Ibid.*, p. 1373-1374.

[46] The process of making picture gradually less clear. See *Oxford Advanced Learner's Dictionary*, 6th edition, p. 416.

[47] A movement over an area to search for something. See *Oxford Advanced Learner's Dictionary*, 6th edition, p. 1212.

Superimposition of both in vertical and horizontal sections helps to see the concordance and correlation between the skull and the underlying facial tissue.[48]

Koelmeyer[49] however used a television camera linked to the x-ray apparatus. Three video camera was used which each were focused on the photograph, x-ray of the skull, and the partly reconstructed skull. Similarly, the assembly was also facilitated with 'fade-out' and 'sweep' facilities. It was later where Iten[50] produced a video camera superimposition that uses three monitors, and yet similar application as previously illustrated.

Computer-assisted approach was later developed. Ubelaker et. al.[51] developed a computer-assisted approach which equipment consist of a two system, video camera and computer system. The computer system was comprised of a collection of propriety software and associated hardware (personal computer, data tablet, color display monitor, and video camera with light). Similar as video technique, the video camera is used to capture the images of skull and photograph. With the addition of computer, the images produced by the video camera is digitized and stored in the computer. The digital information of the digitized image is then used to produce a video image displayed on the monitor. The special function of proprietary software is it can remove the soft tissue of the face photograph to view the underlying skeletal structure.[52] The method of operation of superimposition by computer is described as follows:[53]

> The photograph is placed under the video camera and the image is adjusted until it fills at least 67% of monitor screen. This image is then digitized and stored within the computer. A transparent plastic sheet is taped to the monitor and key anatomical landmarks (contour of face, base of nose, borders of eyes and nose, and so forth), are traced on the plastic. The image of the photograph is then removed from the monitor and the photograph itself is replaced under the camera by the cranium and the articulated mandibles with appropriate tissue-thickness markers in place. The

[48] Bastian, R.J., Dalitz, G.D., and Woodward, C., (1986). "Video superimposition of skulls and photographic portraits-a new aid in identification," *Journal of Forensic Science*, Vol. 31, No. 4, p. 1374.
[49] See Note 7, page 27.
[50] See Note 6, page 27.
[51] Ubelaker, D.H., Bubniak, E., and O'Donnell, G., (1992). "Computer-assisted photographic superimposition," *Journal of Forensic Science*, JFSCA, Vol. 37, No. 3, p.753.
[52] *Ibid.*
[53] *Ibid.*

cranium is placed on a donut ring and manipulated manually until the position approximates that of the individual in the photograph.

Using camera controls, the size of the cranium mandibles image is adjusted so that it is as close as possible to that of the photograph. This is accomplished by comparing anatomical landmarks on the cranium and mandible with their photographic counterparts marked on the plastic monitor overlay. The orientation of the cranium and mandible and the sizing are adjusted until the fit is as close as possible. The image of the cranium and mandible is then digitized. Both images are then superimposed on the monitor for detailed comparison, including the opportunity to remove the soft tissue to view the underlying skeletal feature. The image maybe permanently stored within the computer. High quality of hard-copy printouts of any desired combination of skeletal-photographic comparative image can be easily generated.

The present system of superimposition, namely video camera in combination with computer system are also utilized by other scholars include Yoshino et. al.,[54] and Shahrom al.[55] Currently, superimposition technique has entered into a new phase of advancement. These include superimposition by Extended Symmetry Perceiving Adaptive Neuronet (ESPAN),[56] and genetic algorithm.[57] The working principle of ESPAN is simplified as follows:[58]

The facial and skull image are put into SPAN as "source" and "target" input respectively. A feature points are selected on the source image as unique pixels. While the target image is fixed as a rectangular zone. Next, the entire source image is presented to the trained SPAN which subsequently responds by outputting a processed source image such that (i) the nearly front view facial features are retained invariant, (ii) the error involved in mapping of the front view segment as above is less than the picture resolution limit, i.e. one pixel width; (iii) the SPAN output image is superimposable over the SPAN target image. Thus, the two images can now be compared by direct superimposition in respect of nearly front view segment both holistically as well as feature-wise.

ESPAN is unique in its strategy of identification and application as it offers a different approach from the previous technique. When the previous superimposition deals with 3D cranial image, ESPAN only deals with front view image. This feature is absence in previous technique. In addition, this new system is free from the reconstructing a 3D cranial image

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[54] See more details on this superimposition technique by the authors in Chapter 1, page 12-15.
[55] See more details in Chapter 1, page 18-20.
[56] Ghosh, A.K., and Sinha, P., (2001). "An economized craniofacial identification system," *Forensic Science International*, Vol. 117, p. 109-119.
[57] See details on this technique in Chapter 1, page 22-23.
[58] See Note 56, p. 110-111.

and only deals with front view image.[59] Other additional advantages the technique offers are it is inexpensive, rapid process, and involve less manual labour.[60]

Nowadays, skull-photo superimposition is often accompanied with other evidence present at the crime scene alongside the skeletal remains of the dead person. Evidences that have been reported to be encountered at a crime scene are such as medal and wrist watch[61] and earing.[62] These evidences were found to be the personnel effect of the victim or the dead person, and this confirms the identity of the victim and thus facilitates the investigation as well as superimposition process. From back then until present time, skull-photo superimposition has been used as a supportive system for identification. The technique was incorporated with other analysis such as dental[63] and DNA profiling[64] to enhance the reliability and confirmation for human identification.

As we have seen, the application of skull-photo superimposition so far has proven to be successful in identifying an individual. It continues to be the method of choice employed particularly for identifying a skull recovered in a crime scene. What matters is the capability of the identification technique to identify an individual to facilitate forensic investigation process.

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[59] *Ibid.*, p. 110.
[60] *Ibid.*, p. 110.
[61] Iscan, M.Y., and Solla, H.E., (2001). "Skeletal remains of Dr. Eugenio Antonio BerrõÂos Sagredo: A case report," *Forensic Science International*, Vol. 116, p. 201-211.
[62] Noorazma, S., and Shahrom, A.W., (2007). "Identification of a charred skull: a case report," *Journal of Forensic Medicine and Toxicology*, Vol. 24, No. 2, p. 15-19.
[63] *Ibid*, Bilge, Y., Kedici, P.S., Alakoc, Y.D., Ulkuer, K.U., and Ilkyaz, Y.Y., (2003). "The identification of a dismembered human body: a multidisciplinary approach," *Forensic Science International,* 137, p. 141-146; Basauri, C., (1967). "A body identified by Forensic Odontology and superimposed photograph," *Int. Criminal Police Review*, 204, p. 37-43.
[64] Bilge, Y., Kedici, P.S., Alakoc, Y.D., Ulkuer, K.U., and Ilkyaz, Y.Y., (2003). "The identification of a dismembered human body: a multidisciplinary approach," *Forensic Science International,* 137, p. 141-146; Iscan, M.Y., Solla, H.E., and McCabe, B.Q., (2005). "Victim of a dictatorial regime: Identification of Mr. Roberto Gomensoro Josman," *Forensic Science International*, Vol. 151, p. 213–220.

It is claimed that superimposition was at best used in exclusion rather than inclusion.[67] In the identification of a murdered girl for example, Iten[68] conducted a control experiment where the skull of suspected victim was superimposed with a photograph of another girl of the same age and body build. From the experiment, it was found that the superimposition image produced was not significant to each other. Both the skull and photo image was not in concordance to each other. Based from this finding, the skull was not belong to the girl and was excluded.

Possibility of mismatch between the skull and the photograph can occur in superimposition. As De Vore noted that:[69]

> It is conceivable that the two faces of completely different sizes may have similar skeletal configurations and thereby results in an erroneous identification.

Factors that contribute to this problem are the incomplete skull,[70] flesh thickness of face and the video image.[71] Incomplete skull (e.g. teeth or mandible absent) may preclude superimposition as skull can show a good match with a photograph of another person. This can lead to erroneous identification and produce unreliable result.[72]

Facial flesh thickness are varies in individuals. There are fat people with thicker flesh thickness, and thin people with thinner flesh. Thin people may however have thicker flesh and vice versa. This scenario makes identification more difficult. Apart from that, a

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[67] De Vore, T., (1977). "Radiology and photography in forensic dentistry," *Dent Clin North Am*, Vol. 21, p. 81, as cited in Shahrom, A.W., Vanezis, P., Chapman, R.C., Gonzales, A., Blenkinsop, C., and Rossi, M.L., (1996). "Technique in facial identification: computer-aided facial reconstruction using a laser scanner and video superimposition," *Int J Legal Med*, Vol. 108, p. 200.

[68] Iten, P.X., (1987). "Identification of skulls by video superimposition," *Journal of Forensic Science*, JFSCA, Vol. 32, No. 1, p. 182-183.

[69] De Vore, T., (1977). "Radiology and photography in forensic dentistry," *Dent Clin North Am*, Vol. 21, p. 69-81, as cited in Ubelaker, D.H., Bubniak, E., and O'Donnell, G., (1992). "Computer-assisted photographic superimposition," *Journal of Forensic Science*, JFSCA, Vol. 37, No. 3, p.752.

[70] Koelmeyer, T.D., (1982). "Videocamera superimposition and facial reconstruction as an aid to identification," *The American Journal of Forensic Medicine and Pathology*, Vol. 3, No. 1, p. 45.

[71] Jayaprakash, P.T., Srinivasan, G.J., and Amravaneswaran, M.G., (2001). "Cranio-facial morphoanalysis: a new method for enhancing reliability while identifying skulls by photo superimposition," *Forensic Science International*, Vol. 117, p. 122-123.

[72] See Note 70.

video image produced when superimposing the skull with the photograph is usually hazier when compared with the submitted photograph of a suspected victim. This lack of quality video image affects the assessment of superimposition result between the skull and the photograph.[73] Therefore, as has been mentioned, superimposition is recommended to be a reliable technique of excluding a skull rather than inclusion.

Apart from the aforementioned, there are other setbacks which continue to be a critical issue. They are enlargement of antemortem photograph and alignment of the skull to the photograph[74] which are inherent operating procedure in any superimposition technique. This is where the value of superimposition to identify human is being challenged and disputable. There are no hard and fast rule in regards to enlarging the photograph to a life size and aligning the skull to the photograph. The skull and the photograph can be manipulated in variety of ways depends on the type of superimposition used in an attempt to achieve good superimposition so that both skull and photograph can fit to each other. What matters the most in the superimposition process is the photograph must be enlarged to life-size accurately so that it can be accurately superimposed to the skull.[75] To produce an accurate superimposed image seems to be a challenge as erroneous result can occur.

Another critical factor is the alignment of the skull to the photograph. Generally, full facial photograph with front view facilitates alignment process. But however, full facial photograph are not always available. Slight deviation of the face to the left or right side in the photograph will hinder the correct alignment.[76]

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[73] Jayaprakash, P.T., Srinivasan, G.J., and Amravaneswaran, M.G., (2001). "Cranio-facial morphoanalysis: a new method for enhancing reliability while identifying skulls by photo superimposition," *Forensic Science International*, Vol. 117, p. 122-123.

[74] Bastian, R.J., Dalitz, G.D., and Woodward, C., (1986). "Video superimposition of skulls and photographic portraits-a new aid in identification," *Journal of Forensic Science*, Vol. 31, No. 4, p. 1373.

[75] *Ibid.*

[76] *Ibid.*

To overcome the aforesaid problem, Sekharan for example has established an enlargement factor by measuring an object found in the photograph,[77] and by marking the anatomical landmarks in the enlarged photograph and the skull, and the distance between the anatomical landmarks were measured and compared.[78] Others by using focal length of the camera lens.[79]

Enlargement factor by using the teeth was conceived by McKenna et. al.[80] Teeth as an enlargement factor is more convincing as it enables to accurately superimpose teeth image from both skull and photograph. However, there is one factor that needs to be considered while using teeth as an enlargement factor. The teeth must be clearly visible in the photograph so that correct and exact enlargement can be achieved. As teeth from one individual to another are different, it is possible to manipulate the teeth with reference to the person in the photograph. The use of teeth as an enlargement factor for more accurate enlargement is supported by Bastian et al.[81]

To overcome problem aroused from alignment of skull and photograph, the use of full facial photograph is advisable. Photograph with front view facilitates alignment process. But however, full facial photograph are not always available. Slight deviation of the face to the left or right side in the photograph will hinder the correct alignment.[82] To minimize problems of alignment, Colonna et. al. have developed a computer program and video

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[77] See more details on this technique by Sekharan on page 31-32.
[78] Sekharan, P., (1971). "A revised superimposition technique for identification of the individual from the skull and photograph," *The Journal of Criminal Law, Criminology, and Police Science*, Vol. 62, No. 1, p. 112-113.
[79] Glaister, J., and Brash, J., (1937). "Medico-legal aspect of Buck Ruxton case," E & S Livingstone, Edinburg, p. 144-170, as cited in Bastian, R.J., Dalitz, G.D., and Woodward, C., (1986). "Video superimposition of skulls and photographic portraits-a new aid in identification," *Journal of Forensic Science*, Vol. 31, No. 4, p. 1373.
[80] McKenna, J., Jablonski, N., and Fearnhead, R., (1984). "A method of matching skulls with photographic portraits using landmarks and measurement of dentition," *Journal of Forensic Science*, Vol. 29, No. 3, p. 787-797.
[81] Bastian, R.J., Dalitz, G.D., and Woodward, C., (1986). "Video superimposition of skulls and photographic portraits-a new aid in identification," *Journal of Forensic Science*, Vol. 31, No. 4, p. 1375.
[82] See Note 74.

camera system (with specialized lens system).[83] This system is operated by comparing hundreds of computer-read angles at similar positions on the skull and photograph. This technique is said to be more reliable and accurate in matching the skull with the photograph.[84] On the one hand, study conducted by Austin has opined that skull-photo superimposition can be a reliable technique if two or more photographs are used in the superimposition for comparison, and the facial photograph are available in not only front view but also in other various angles.[85]

Despite of some limitations of superimposition that it may seem, works have been attempted to increase the reliability of superimposition between the skull and the photograph. Automated technique of superimposition in addition has been developed to tackle some problems and limitations exist in the previous technique.[86]

## 2.4 CASE REPORT

This chapter has provided a detailed and comprehensive account on the use of superimposition analysis in forensic investigation. The following is a description of a case report of a murder victim and the use of skull-photo superimposition as one of the means of analysis to identify the suspected victim.

A corpse expected to be of Bai Dhanu, a wife was recovered. The victim was suspected to be murdered by the appellant (name unknown) on grounds of to marry Manjula. Further, the relationship between the victim and the appellant were strained.

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[83] Colonna, M., Pesce Delfino, V., and Introna, F., (1980). "Identificaziona mediante sovrappsosizione cranio-foto del viso a messo di circutto television: Applicazione specimentale di una nuova metodica," Bulletino Della Socieo Italiana Di Biologia Sperimetale," p. 2271-2276, as cited in Bastian, R.J., Dalitz, G.D., and Woodward, C., (1986). "Video superimposition of skulls and photographic portraits-a new aid in identification," *Journal of Forensic Science*, Vol. 31, No. 4, p. 1375.

[84] *Ibid.*

[85] Austin-Smith, D., and Maples, W.R., (1994). "The reliability of skull/photograph superimposition in individual identification," *Journal of Forensic Science*, JFSCA, Vol. 39, No. 2, p. 446.

[86] The automated techniques are superimposition by using genetic algorithm and Extended Symmetry Perceiving Adaptive Neuronet (ESPAN) (See Chapter 1, page 22-24).

The evidences found on the corpse were four red plastic bangles and hair pin by prosecution witness 3, Suman Bhaga. The skeleton were packed and sealed in a wooden box by prosecution witness 2, Dr. Barot. All the evidences found were sent to forensic laboratory for further examination by Forensic Expert.

Opinion given by the expert was that the hairs on the skeleton were identified to be of a human being probably a female. Further observation from the length of the hair and the hair pin found, the corpse was reasonably of a female. The bones were analyzed to determine the sex and age. From the bone analysis by the expert, the bones were ascertained to be belong to a female, and the age of the victim was estimated to be around 20-26 years of age.

Apart from that, skull-photo superimposition analysis was also conducted to examine whether the skull was of the deceased. For this purpose, photograph of Bai Dhanu was forwarded to the forensic laboratory and routine procedures of superimposition were carried out. The photograph of Bai Dhanu was enlarged to a life size and superimposition was conducted by measuring the distance between the various anatomical landmarks on the photograph of the skull with mandibles as well as on the photograph of the face of the Bai Dhanu. The outcomes of the superimposition have made the forensic expert to opine that, there was a striking correspondence between the mandible of the skull and the mandible of the photograph of Bai Dhanu. Overall analysis of the bones have ascertained that, (i) the skeleton was belonged to a female victim with age above 20 years but under 26 years of age, and (ii) the measurement of the skull and with the mandible of the skeleton when superimposed on the photograph of the face of Bai Dhanu showed a striking correspondence between the two.

In bringing the expert opinion before the court, there was a contentious argument between the advocate of the accused (Mr. Padia) and the lawyer (Mr. Mehta). Mr. Padia

estimation from bones was conducted. Circumstantial evidences and personnel effects found has assisted in the investigation and thereby confirmed the identity of the deceased.

# CHAPTER 3

# RESEARCH FINDINGS

## 3.1 INTRODUCTION

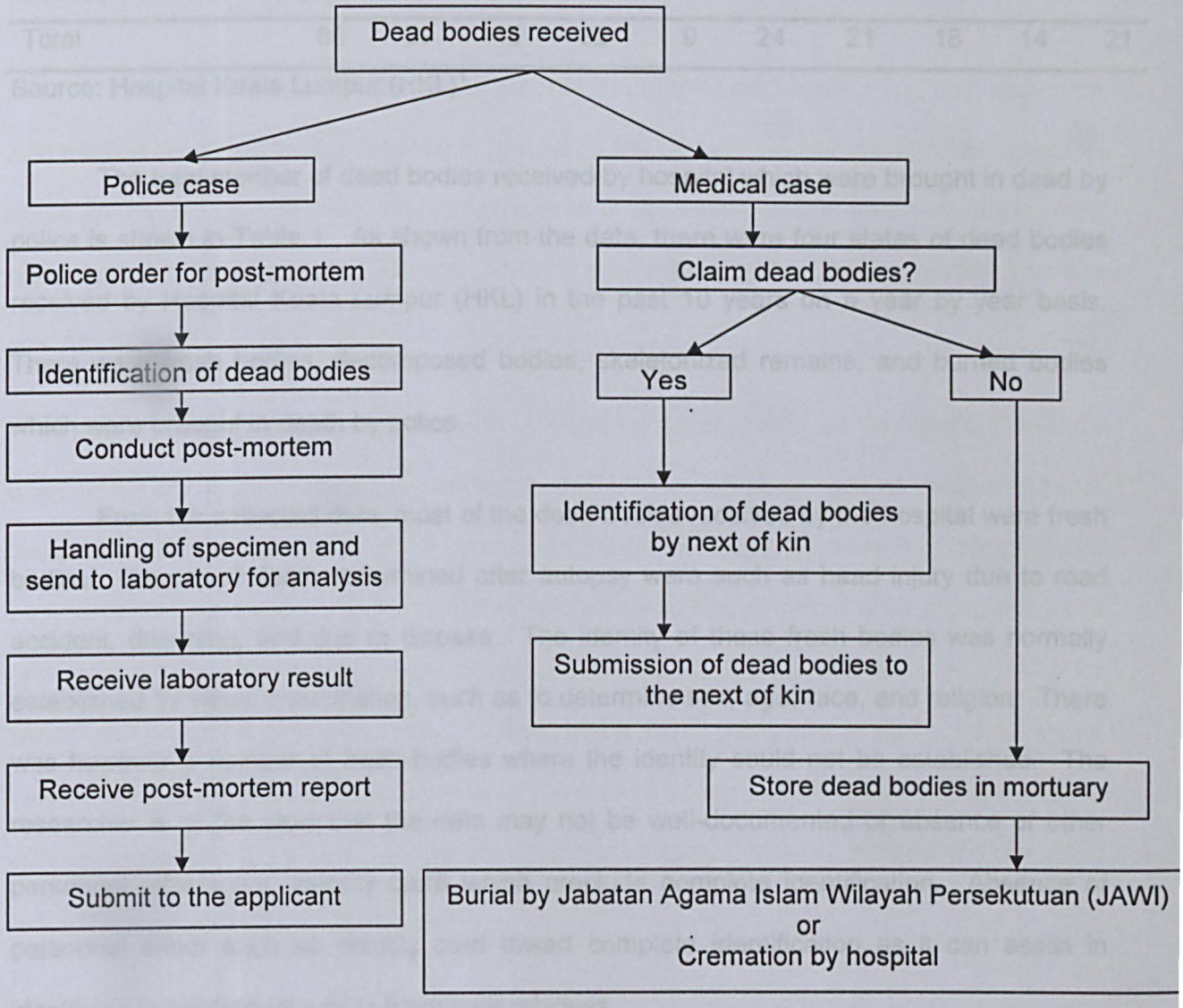
This chapter aims to discuss the various tools of identification technique employed in Malaysia for human identification purpose based on the collected data and information through interviews. Besides, this chapter will specifically disclose the utility and the present state of the art of the so-called technique, skull-photo superimposition in Malaysia. A detailed account of the technique practiced in other countries such as India, Australia, New Zealand and many other countries has been provided in earlier chapter.

Firstly, there are several institutions in Malaysia that plays a critical and important role in forensic investigation. It includes governmental hospitals, teaching hospitals, Chemistry Department of Malaysia, and Royal Malaysian Police (RMP). These institutions not only assist in forensic investigation but also for the purpose of legal requirement in the pursuit of justice. Each institution has their own expert in the related field such as anthropologist, pathologist, and investigating officers. They have a different role and yet depending on each other for the purpose of achieving one aim, scientific assistance in dissemination of justice.

As to other countries, the routine technique to ascertain identity of unknown dead bodies in Malaysia is established by deoxyribonucleic acid (DNA), fingerprint, and dental analysis. Skull-photo superimposition may not as popular as the aforesaid analysis, or in a very real sense, the technique receives less attention or less interest from the institutions which involved in investigation. It is important to recall that skull-photo superimposition is a scientific technique where the unknown skull is superimposed with a facial photograph of a suspected missing or dead person in an attempt to establish the identity.

There are two types of dead bodies received by the hospital. There are dead bodies which were brought in dead by police (police case), and dead bodies from hospitals due to medical causes (medical case). In this research, researcher will focus on dead bodies which were brought in dead by police (police case) which was recorded as 'unknown' or 'unidentified' dead bodies. A figure provides below shows the process of handling dead bodies once received by the hospitals.

Figure 26: Flow chart of dead bodies management in hospital.




Source: Hospital Kuala Lumpur (HKL)

### 3.2 HOSPITAL KUALA LUMPUR (HKL)

Table 1: Number of unidentified dead bodies from year 1999-2008.

| Dead bodies \ Year | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|---|---|---|---|---|
| Fresh bodies | 63 | 38 | 43 | 28 | 7 | 21 | 16 | 16 | 13 | 21 |
| Decomposed bodies | 2 | - | 1 | 3 | 1 | 2 | 2 | 2 | 1 | - |
| Skeletonized remains | 1 | 1 | 1 | 1 | 1 | - | 3 | - | - | - |
| Burned bodies | - | - | - | - | - | 1 | - | - | - | - |
| Total | 66 | 39 | 45 | 32 | 9 | 24 | 21 | 18 | 14 | 21 |

Source: Hospital Kuala Lumpur (HKL)[1]

The total number of dead bodies received by hospital which were brought in dead by police is shown in Table 1. As shown from the data, there were four states of dead bodies received by Hospital Kuala Lumpur (HKL) in the past 10 years on a year by year basis. There were fresh bodies, decomposed bodies, skeletonized remains, and burned bodies which were brought in death by police.

From the collected data, most of the dead bodies received by the hospital were fresh bodies. Causes of death determined after autopsy were such as head injury due to road accident, drowning, and due to disease. The identity of these fresh bodies was normally established by visual examination, such as to determine sex, age, race, and religion. There was however a number of fresh bodies where the identity could not be established. The researcher is of the view that the data may not be well-documented or absence of other personnel effects (i.e. identity card) which preclude complete identification. Absence of personnel effect such as identity card thwart complete identification as it can assist in identifying the individual and to trace their relatives.

[1] Mortuary Record of Hospital Kuala Lumpur (HKL)

There were also a number of decomposed bodies received by the hospital. The cause of death could not be ascertained and the identity of the victim could not be established properly. This was due to advanced decomposition that precludes the establishment of identity and determination of cause of death. There was however one case of decomposed bodies received and the cause of death were determined as injury on chest and face due to blunt trauma.[2] Noticeable disfigurements at the face and chest of the dead bodies have rendered the examiner to opine that the cause of death was due to injury. However, similar to those other decomposed bodies, information such as age, sex, race and religion was failed to be ascertained.

Skeletal remains were also been recorded in almost each year. The sex, age, race and religion could not be established in almost all the cases. Apart from that, the cause of death cannot be determined.[3] The researcher is of the view that the data may not be well-documented or anthropologist did not play their active role in establishing identity from the skeletal remains.

From the information obtained, the unidentified dead bodies will be disposed after 14 days, and the hospital will start requesting from the religious body such as Jabatan Agama Islam Wilayah Persekutuan (JAWI) and crematorium building, Dewan Bandaraya Kuala Lumpur (DBKL) to handle the bodies. Unidentified dead bodies which were assessed as or believed to be Islam will be sent to Jabatan Agama Islam Wilayah Persekutuan (JAWI) for burial, while other unidentified dead bodies which were assessed or believed to be as belong to other religions will be cremated. The buried bodies will be marked with reference number.[4] Reference number is important for possibilities that may necessitate the dead bodies to be exhumed and re-examined.

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[2] See Appendix 2 (g) at page 128 (highlighted in yellow).
[3] See example on Appendix 2 (a) at page 121 (highlighted in pink).
[4] Interview with Dr. Nurliza Abdullah, Consultant and Forensic Anthropologist of Hospital Kuala Lumpur (HKL), on 28th August, 2009.

The routine attempts that are being employed to scientifically establish the identity of the unidentified dead bodies are DNA analysis, visual recognition, and fingerprint analysis particularly for fresh dead bodies.[5] Skull-photo superimposition technique is not being employed in Hospital Kuala Lumpur (HKL). From the point of view of the anthropologist, the technique is deemed as unreliable for human identification. In addition, the operating procedure in superimposition (e.g. enlarging photo to life size) is questionable and arguable. Apart from that, expert to conduct skull-photo superimposition process was insufficient.[6] These factors seem to dampen their confidence to utilize this technique.

### 3.3 UNIVERSITI MALAYA MEDICAL CENTRE (UMMC)

Table 2: Number of unidentified dead bodies from year 2003-2008.

| Dead bodies \ Year | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|---|
| Fresh bodies | 26 | 17 | 24 | 27 | 11 | 15 |
| Decomposed bodies | - | - | 1 | - | - | - |
| Skeletonized remains | - | - | 1 | - | - | - |
| Burned bodies | - | - | - | - | - | 1 |
| Total | 26 | 17 | 26 | 27 | 11 | 16 |

Source: University Malaya Medical Centre (UMMC)[7]

Table 2 above shows a total number of dead bodies received by the University Malaya Medical Centre (UMMC) in the past 6 years on a year by year basis. Similarly, there were four states of dead bodies received by institute. There were fresh bodies, decomposed bodies, skeletonized remains, and burned bodies which were brought in death by police.

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[5] *Ibid.*
[6] *Ibid.*
[7] Mortuary Record of University Malaya Medical Centre (UMMC).

From the collected data, the total number of dead bodies received was lesser compared to that of Hospital Kuala Lumpur (HKL). Pathologist of University Malaya Medical Centre (UMMC) stated that, the institute received a limited number of dead bodies as some of them will be sent to Hospital Kuala Lumpur (HKL) for further examination.[8]

Most of the dead bodies received by the institute were fresh bodies. Autopsy revealed the cause of death as hanging, drowning, and due to disease. The identity of these fresh bodies was normally established by visual examination, such as to determine sex, age, race, and religion. There was however a number of fresh bodies where the identity (e.g. race or religion) could not be established. This was maybe due to absence of personnel effect such as identity card number which hinders complete identification.[9]

There were also a number of decomposed bodies received by the institute for the past 6 years. The cause of death could not be ascertained and the identity of the victim (e.g. race and religion) could not be established properly. This is due to advanced decomposition that precludes the establishment of identity (race and religion) and determination of cause of death. In a case of drowning particularly, the identity of victim is difficult to ascertain as the facial feature was almost unrecognizable.[10] Similar problem encountered in burned body.[11]

Skeletal remains were also recorded. However the total number received is the least in number. The race and religion could not be established. Apart from that, the cause of death cannot be determined.[12] The researcher is of the view that the data may not be well-documented or anthropologist did not play their active role in establishing identity from the skeletal remains.

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[8] Interview with Associate Professor Dr. Mathiharan, Consultant and Forensic Pathologist of University Malaya Medical Centre (UMMC), on 25th November, 2009.
[9] See Appendix 3 (a) at page 132 (highlighted in blue).
[10] See Appendix 3 (c) at page 134 (highlighted in yellow).
[11] See Appendix 3 (f) at page 137 (highlighted in yellow).
[12] See Appendix 3 (c) at page 134 (highlighted in pink).

From the information obtained, the handling of dead bodies in University Malaya Medical Centre (UMMC) was not much different with that of Hospital Kuala Lumpur (HKL). The unidentified dead bodies will be disposed after a certain period of time and will be sent to Jabatan Agama Islam Selangor (JAIS) or undertaker, Kuala Lumpur Funeral Service, Klang Lama. Unidentified dead bodies which were assessed or believed to be Islam will be sent to Jabatan Agama Islam Wilayah Persekutuan (JAWI) for burial, while other unidentified dead bodies which were assessed or believed to be as belong to other religions will be submitted to undertaker. The buried bodies will be marked with reference number.[13] Reference number is important for possibilities that may necessitate the dead bodies to be exhumed and re-examined.

Similarly, routine examinations to analyze dead bodies are DNA analysis, visual recognition, and fingerprint analysis particularly for fresh dead bodies. Skull-photo superimposition technique is not being employed in University Malaya Medical Centre (UMMC). From the point of view of the pathologist, the technique is unreliable for human identification and the routine attempt taken to scientifically identify dead bodies was DNA analysis. According to Associate Professor Dr. Mathiharan, skull-photo superimposition can produce false result as the unknown skull can be wrongly superimposed with a photograph of living individual.[14] However, the researcher is of the view that problems of mismatch as claimed by Associate Professor Dr. Mathiharan can be overcome as new and more improved technique has been developed to increase the reliability and validity of the superimposition result. Compared to Hospital Kuala Lumpur (HKL), the institute receives less skeletal remains and therefore the technique was disregarded. Some of the dead bodies will be sent to Hospital Kuala Lumpur (HKL) for further action.[15]

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[13] Interview with Associate Professor Dr. Mathiharan, Consultant and Forensic Pathologist of University Malaya Medical Centre (UMMC), on 25th November, 2009.
[14] *Ibid.*
[15] *Ibid.*

Case details on DNA identification from bones as shown in Table 3 on next page was obtained from University Malaya Medical Centre (UMMC). All the presented cases required identification from DNA extracted from bones. Owing to confidentiality of the case, the researcher has managed to obtain only a limited number of cases.

Table 3: Case details of DNA identification from bones from year 2004-2007.

| Year | Deceased | Autopsy No. | Type of samples | Police report no. |
|---|---|---|---|---|
| 2004 | Unknown | A218/04 | 1. Bone marrow (DNA) | Seri Kembangan 2886/04 |
| 2005 | Unknown | A320/05 | 1. Bone sternum (DNA)<br>2. Scalp hair (DNA)<br>3. Tooth (DNA)<br>4. Muscle<br>5. Clothing | Sealed |
| 2006 | Unknown | A473/06 | 1. Blood (Toxicology and DNA)<br>2.Bone (DNA) | Putra Heights 2183/06 |
| 2007 | Unknown | A20/07 | 1. Blood (toxicology)<br>2. Bone and head hair (DNA) | Puchong 278/07 |

Source: University Malaya Medical Centre (UMMC)[16]

From the case details, DNA identification from bone was analyzed in decomposed and skeletonized bodies. A necessity comes for DNA analysis as the facial features was almost not appreciated to be recognized visually. However, some of the DNA report was pending for identification[17] and there was also a specimen where it was preserved to be used if necessity comes for DNA study.[18]

Deceased with autopsy report A320/05 for example, was decomposed and partly skeletonized. The samples that were sent to Chemistry Department for DNA analysis were bone sternum, hair, and tooth. Other samples include muscle and clothing. DNA report was

[16] Chemistry Record of University Malaya Medical Centre (UMMC).
[17] See Appendix 4 (f) at page 143.
[18] See Appendix 4 (e) at page 142.

pending and cause of death reported was due to multiple slash wound by sharp edge weapon.[19] Further information on the DNA result was inaccessible. Pending DNA result was probably due to unavailable DNA sample from relatives for comparison purpose. Thus, the identity of the victim was failed to be established.

From the case details presented, there was obvious limitation in regards to individual identification from DNA bones. The overriding factor was probably unavailable DNA sample from the relatives for comparison purpose.

### 3.4 ROYAL MALAYSIAN POLICE (RMP)

Table 4: Number of missing persons, traced alive, and remained missing from year 2004-2009.

| Year | 2004 | 2005 | 2006 | 2007 | 2008 | Jan-Apr 2009 |
|---|---|---|---|---|---|---|
| Total number of missing persons | 4454 | 3450 | 2692 | 2333 | 2219 | 1364 |
| Traced alive | 3021 | 2196 | 1579 | 1391 | 1089 | 576 |
| Remained missing | 1433 | 1254 | 1113 | 942 | 1130 | 788 |

Source: Royal Malaysian Police (RMP)[20]

Table 4 provides above was data on total number of missing persons recorded from year 2004 to 2009. The data also revealed a number of those who has been traced alive and those who were still remained missing. Further data on individuals who were reported missing according to age and sex was shown on Appendix 5 at page 146-151.

From the data shown, number of individuals who were still remained missing was high. The fate of those who were still remained missing is uncertain whether they were still

[19] See Appendix 4 (f) at page 143.
[20] Statistic of missing person in Malaysia, Royal Malaysian Police (RMP).

alive or dead. Year 2004[21] recorded the highest number of those who were still remained missing, while the least number was recorded on year 2007.[22] From the total number of the reported missing person, more than half have been traced alive while the rest were still remained missing.

The overall data revealed that victim aged below 18 were the highest number of those who were missing. Numbers of those who were reported missing were also recorded high in victims aged above 18. Compared to victim below 9 years of age, cases of missing was less. Among the reported missing cases, female was more prevalent compared to male.[23]

Further information obtained from Royal Malaysian Police (RMP) revealed that major factors contribute to cases of missing person include peer influence, elope, runaway from home, and family breakdown. Other marginal factors include syndicate of prostitution, drug addiction, seeking employment and abuse. Missing with unknown reasons was also reported and the figure was fairly high.[24]

Photographs of the missing individuals were maintained as database for 20 years, and sometimes up to 40 years or until the individual being traced.[25] When encountered with unidentified dead bodies discovered at a crime scene, any reported case of missing person will be referred to identify whether the dead bodies was the one who reported missing by the relatives. Further process will be handed to the hospitals to determine the cause of death and establish the identity. Similarly as to other institution, skull-photo superimposition technique is not being employed by the Royal Malaysian Police (RMP).[26] No attempt has been taken so far to use the technique to identify unidentified dead bodies.

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[21] See Appendix 5 (a) at page 146.
[22] See Appendix 5 (d) at page 149.
[23] *Ibid.*
[24] See Appendix 5 (g) at page 152.
[25] Interview with Mr. Amidon Anan, a former Head of Crime Scene Investigation (CSI) and is now a Consultant of Noble Forensic Investigation (NFI) and Service, on 15th December, 2009.
[26] According to Mr. Amidon Anan, the police have no interest to employ skull-photo superimposition technique.

Based from the research findings, identification technique or analysis employed to identify dead bodies were DNA analysis, visual recognition, and fingerprint analysis. These techniques were employed particularly for fresh and decomposed dead bodies. However, not all these dead bodies were successfully identified by these techniques. This may be due to no comparative data available.

On the other hand, no serious action was taken apparently to establish identity of skeletonized human remains. Furthermore, skull-photo superimposition technique was not utilized for identification purpose. The researcher is of the view that skull-photo superimposition technique is worth to be attempted in view of the fact that there were dead bodies (e.g. human skeletal remains, decomposed bodies) continued to remain unidentified. Should the police and expert collaborate more closely, and a photograph of a suspected missing person can be compared with the dead bodies accompanied with the application of skull-photo superimposition technique in an attempt to make identification of the unidentified dead bodies.

## 3.5 DISCUSSION

In a crime scene, dead bodies may be recovered in varying states, such as fresh bodies, skeletonized remains, mutilated bodies, and decomposed bodies. These varying states of remains require different methods of analysis to make identification. One thing for sure, the remains will undergo a post-mortem or autopsy for examination. The aim of post-mortem examination is not limited to make an identification of the dead body and to determine the cause of death.[27] As a routine practice in post-mortem, sex, age, and height of the dead person will be recorded. Other noticeable characteristics such as tattoos if present, wounds and injuries will also be recorded. Biological specimen (e.g. DNA, stomach content) will be taken if necessary for further analysis.[28] If such findings are similar with individuals who have been reported missing or presumed dead, the identity of the dead person can be positively established. Sometimes, the identification process cannot be completed successfully. The absence of or lack of evidences for comparison worsen the situation and finally the deceased cannot be identified.

One of the purposes of scientific analysis is to make a positive identification of a deceased. Positive identification will be difficult when a human remain discovered was badly decomposed or skeletonized remains. Positive identification will be made possible by conducting a combination of a several techniques of analysis. When dealing with decomposed or badly decomposed bodies, complete identification is precluded with the facial features completely unidentifiable. Identification by visual recognition is difficult and almost impossible. Thus, this condition necessitates identification by other means such as fingerprint, DNA analysis or any other possible means to make positive identification. Identification of skeletal remains on the other hand is the most difficult and challenging task in any investigation. Forensic expert especially in anthropological field will exert their expertise to make identification from bones. The determination of race, sex, age, and

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[27] Nadesan, K., (1997). "The importance of the medico-legal autopsy," *Malaysian J Pathol*, Vol. 19, No. 2, p. 106.
[28] *Ibid.*

stature of the victim from the bone gives valuable information in establishing the identity of a person. Determination of sex and age for instance can be ascertained from skull, pelvic bone, and femur. As practiced in other countries, when a skull and a photograph of the suspected deceased person is submitted to forensic expert, identification can be carried out by skull-photo superimposition techniques.[29]

Visual identification or recognition is usually the routine examination of a fresh body. The estimation of age, race and religion will be assessed visually by a naked eye. However, visual identification cannot be used as a sole method of identification as the chances of error can occur.[30] However, the presence of noticeable characteristics such as tattoo, personnel effects such as clothes, jewellery or other items can further assist in the identification.

Positive identification of a deceased is very important and it is a requisite element in a criminal case. It assists in the establishment of the crime occurrence and to link the victim or criminal to the crime. Identification of a dead person is one of the components of *corpus delicti.*[31] In a routine criminal investigation, *corpus delicti* must be fully established. In a murder case for example, the *corpus delicti* will include the body of the victim, evidences such as weapon involved, and other elements which can be linked to the murder (e.g. blood stains, injuries).[32]

One of the aspects of criminal investigation which may have less attention and priority is the investigation of missing persons. The case involving missing persons is difficult to deal with as it is now a trans-border crime.[33] As shown from the data of missing persons provided by the Royal Malaysian Police (RMP), there are missing individuals which still remains missing. The fate of those who is still remains missing is difficult to clarify of

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[29] Examples of the cases were provided in Chapter 1 at page 9-15.
[30] Interview with Dr. Nurliza Abdullah, Consultant and Forensic Anthropologist of Hospital Kuala Lumpur (HKL), on 28th August, 2009.
[31] *Corpus delicti* is an aggregate material circumstance constituting the evidence of an offence. See Anil Aggrawal (2003). *Mystery Magazine Web*, Vol. 1, Issue 2.
[32] *Ibid.*
[33] Wah, K.C., Mary Y., Y.M., Keng, G.B., and Nyeap, N. (2004). "Policing in the new millennium: a Malaysian perspective," *Journal of the Kuala Lumpur Royal Malaysia Police College*, No. 3, p. 7.

their whereabouts and whether they are dead or alive. One of the cases of missing person was a five-year-old Sharlinie Mohd Nashar who continues to remain missing until now.[34]

One successful case of dead person identification is the identification of deceased, Nurin Jazlin bt. Jazimin. Nurin Jazlin bt. Jazimin, an eight-year-old girl was found death a month after the police report has been lodged about her missing. The unidentified child's naked body that was suspected to be that of Nurin was stuffed in a sports bag which was left in front of the shop lot in PJS 1/48, Petaling Jaya. A deoxyribonucleic (DNA) test was conducted by comparing the DNA result of the child and the parents and had confirmed the body as Nurin Jazlin's.[35]

Alternative to DNA analysis, dental identification is a convincing and reliable analysis in identifying unidentified dead bodies. Similar to DNA and fingerprint, human teeth shows a great individuality and can discriminate individuals from the other. Dental identification to identify unidentified dead bodies has been executed in the Highland Towers Condominium disaster.[36] Most of the bodies were badly decomposed and some were reduced to skeleton. However, problems encountered when attempts to make identification by teeth. The major problems were unavailable dental records of the majority of Malaysian people, lost of dental record due to massive fatalities, and some Malaysian had their dental treatment overseas. This seems to be an ominous challenge that frustrates identification process. Less than half of the victims were positively identified, while the remaining had incomplete identity.[37] This

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[34] *The Star Online*, 11th January, 2008, the victim, Sharlinie Mohd Nashar was disappeared from a playground about 200m from her house in Taman Medan, Petaling Jaya, and a massive search was conducted thereafter. Police have alerted all airports and counterparts in neighbouring countries to be on the lookout. There was a possibility that the perpetrator of Sharlinie's abduction was linked to other missing child cases.

[35] *Bernama, 20th September, 2007*, Nurin Jazlin bt. Jazimin, an 8 year old Malaysian girl, was reported missing after she had gone to a wet market located near her house in Section 1, Wangsa Maju, Kuala Lumpur, on the night of August 20, 2007. From the information, she was seen being dragged into a white van. A police report was lodged and extensive search was conducted by several organizations including the mainstream media and NGOs.

[36] A condominium in Highland Towers was collapsed and killing 48 people which trapped in their resident. Disaster Victim Identification (DVI) was mobilized and comprised of pathologist, dentist, and geneticist to help in the identification process. See Alhabshi, S.F., and Nambiar, P., (1995). "The Contribution of Forensic Odontology in the Highland Towers Condominium Disaster," *Annals Dent. Univ. Malaya*, Vol. 2, p. 25.

[37] Alhabshi, S.F., and Nambiar, P., (1995). "The Contribution of Forensic Odontology in the Highland Towers Condominium Disaster," *Annals Dent. Univ. Malaya*, Vol. 2, p. 27.

scenario showed to us the limitation and inadequacy of dental identification among majority of Malaysian as most of the people never had a regular dental check-up and therefore dental records were unavailable.

The researcher is of the view that, skull-photo superimposition can be employed in this particular case as photographs of suspected dead person was available. The photograph can be used for teeth superimposition as the photograph obtained was a smiling photograph and expressing the teeth.[38] Skull-photo superimposition can be an advantage especially when routine identification methods (e.g. DNA, fingerprint, and dental analysis) seem to have its limitation and preclude complete identification. It was a great frustration in the struggling of identifying dead bodies when the utility of skull-photo superimposition was not highlighted and not being attempted in this particular case.

In Malaysia, institutions which involve in forensic investigation such as Hospital Kuala Lumpur, University Malaya Medical Centre, Chemistry Department of Malaysia, and Royal Malaysian Police did not employ skull-photo superimposition technique. The technique was not received careful and appropriate attention from these institutions. To medical practitioners particularly, skull-photo superimposition is deemed unreliable as the technique provides uncertainty toward identification.[39] The assertion was fortified by claiming that the procedure of superimposition process was unconvincing and doubtful (e.g. enlargement of facial photograph to life size to superimpose with skull, superimposed the enlarged photograph to the skull).[40]

Despite of the discrepancy, the researcher was learnt that University Kebangsaan Malaysia Medical Centre (UKMMC) has employed skull-photo superimposition to make identification of unknown human remains. Interview with the pathologist, Professor Dr.

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[38] *Ibid.*

[39] Interview with Dr. Nurliza Abdullah, Consultant and Forensic Anthropologist of Hospital Kuala Lumpur (HKL), on 28th August, 2009, and Associate Professor Dr. Mathiharan, Consultant and Forensic Pathologist of University Malaya Medical Centre (UMMC), on 25th November, 2009.

[40] Interview with Dr. Nurliza Abdullah, Consultant and Forensic Anthropologist of Hospital Kuala Lumpur (HKL), on 28th August, 2009.

Shahrom Abdul Wahid disclosed that superimposition technique used was video superimposition.[41] A case report was documented on a discovery of a burned human remains found in an orchard without any identification, and the charred skull was submitted to the University Kebangsaan Malaysia Medical Centre (UKMMC) for identification.[42] Examination of the charred skull revealed that it was belonged to a female. Due to the badly burnt of the remains, identification by DNA analysis was impossible. Identification by dental radiography was also failed as no data available for comparison. These limitations have necessitated identification by skull-photo superimposition and have showed that the photograph of the suspected missing person was match with the skull. Extensive examination further revealed that the dentures of the deceased was found match with the dental record provided and it can possibly relate with the missing teeth of the deceased. The "Chanel" earring discovered from the charred skull also showed that it was a similar earring worn by the deceased as shown from the photograph. Based from the analysis and evidence found, the skull of the deceased was positively identified as that of the suspected missing person.[43]

From the case presented, it showed that the routine and usual analysis (DNA analysis and fingerprint analysis) was impossible to be carried out as the skeletal remains were burnt. The situation finally rendered the medical examiners to resort to skull-photo superimposition and the identity of the deceased was positively identified. In addition, the result of the analysis was corroborated with other survive method and the recovered earring. The researcher was unable to access further details of the case out of management problems with University Kebangsaan Malaysia Medical Centre (UKMMC).

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[41] Interview with Professor Dr. Shahrom Abdul Wahid, Forensic Pathologist of University Kebangsaan Malaysia Medical Centre (UKMMC), on 28th June, 2009.
[42] Noorazma, S., and Shahrom, A.W., (2007). "Identification of a charred skull: a case report," *Journal of Forensic Medicine and Toxicology*, Vol. 24, No. 2, p. 15-19.
[43] *Ibid.*

On the other hand, Faculty of Dentistry, University of Malaya (UM) has its own skull-photo superimposition set-up in their laboratory.[44] The superimposition set-up was developed based on technique conceived by Furue.[45] However, the superimposition facility was intended only for a research purpose. The research that has been undertaken was attempted to investigate the application of the technique for forensic purpose. As yet, superimposition facility in the Faculty has not been utilized and employed to any criminal case, and the facility was finally dismantled.[46]

There are lots of pertinent researches and documented literatures or journals on the utility and development of skull-photo superimposition technique. The technique has from time to time developed into a more improved and sophisticated technical process to increase the reliability of the technique. Therefore, the researcher is of the view that skull-photo superimposition can be a reliable technique for human identification. Besides, the researcher is of the view that we may have lack of access to this technique and to the technical process involved. A better understanding and careful consideration on skull-photo superimposition technique should be explored so that access to this scientific technique which has the potential for reliable identification will not be disregarded.

In relation to this matter, there are several setbacks foresaw in regards to the utility and development of skull-photo superimposition in Malaysia. Compared to other countries, Malaysia may have insufficient experts or professionals with technological knowledge especially in conducting superimposition process as it deals with electrical devices and requires a skilled manual labor. Because of the scarcity of skilled manpower, the utility and

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[44] Scully, B., and Nambiar, P., (2002). "Determining the validity of Furue's method of craniofacial superimposition for identification." *Annal Dent Univ Malaya*, Vol. 9, p. 17-22.

[45] Superimposition facility available in Faculty of Dentistry, University of Malaya was based on method developed by Furue. The set-up was comprised of mirrors, skull mounting, panning motor, light, lighting controls, stands and grids. See Scully, B., and Nambiar, P., (2002). "Determining the validity of Furue's method of craniofacial superimposition for identification." *Annal Dent Univ Malaya*, Vol. 9, p. 18.

[46] Interview with Professor Dr. Phrabhakaran Nambiar, Lecturer and Head of Department of General Dental Practice and Oral & Maxillofacial Imaging, Faculty of Dentistry, University of Malaya, on 11th January 2010.

usefulness of skull-photo superimposition may have been left unexplored and have not being used productively.

On the one hand, the usefulness of skull-photo superimposition depends on the availability of photograph of suspected dead person. In some cases however, unavailable smiling photo of the dead person preclude the implementation of this technique as smiling photo can be manipulated for teeth superimposition. The absence of skull or partial skull (skull without mandible or teeth) compounds this problem. In addition, the superimposition set-up will involve a considerable expenditure.

The states of dead bodies encountered at a crime scene have as well affected the popularity and utility of skull-photo superimposition. Presented data on number of unidentified dead bodies received by Hospital Kuala Lumpur (HKL) and University Malaya Medical Centre (UMMC) showed that fresh bodies were the most discovered remains by the police. Human skeletal remains were the least number discovered and each year there were only 1 to 3 cases reported. The researcher is of the view that the least probability of human skeletal remains discovered has made the popularity and utility of this technique was disregarded and received less interest.

Despite of the foresaw limitations, skull-photo superimposition can offer a considerable yet practical contribution to forensic investigation and to legal matters. Apparent lack of knowledge displayed by some professionals and authority has dampened the utility of this technique which have potentials to assist in human identification as well as in police investigation. A slow diffusion of knowledge might have as well contributed to this problem. Thus, it would be useful to explore the capability of skull-photo superimposition technique as one of the identification means while still emphasizing positive identification by using any possible means, including DNA, fingerprint, and dental analysis.

### 3.5.1 THE IMPORTANCE OF DEAD BODIES IDENTIFICATION

Positive identification of dead bodies in a criminal case (or any disaster which claimed massive fatalities) is important for both legal and humanitarian reasons. In legal aspect, positive identification of a deceased or unknown human remains is important to an investigation and it goes hand-in-hand with other process (e.g. determine the cause of death), and subsequently in further legal proceeding. Therefore, it is the responsibility of the experts who involve in medico-legal investigation process to materialize it.

In Malaysia, inquiries of death are covered under Chapter XXXII of the Criminal Procedure Code.[47] Thus, any reported deaths are subjected to an inquest. For example, as stated in Section 328 of the Criminal Procedure Code,[48]

> In this Chapter the words 'cause of death' include not only the apparent cause of death as ascertainable by inspection or post mortem examination of the body of the deceased, but also all matters necessary to enable an opinion to be formed as to the manner in which the deceased came by his death and as to whether his death resulted in any way from, or was accelerated by, any unlawful act or omission on the part of any other person.

When death occurred, cause of death is an important factor in any legal aspect. This is where an inquest is a necessity which aims to ascertain facts pertaining to the death. The objectives of conducting an inquest are to ascertain the identity of the dead person, the date and time of death, the place where the death had occurred and the cause and manner of death.[49] This necessary information is obtained from inquiry and post-mortem.[50] There are two conditions which determine the necessity of post-mortem. Deaths which are subjected

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[47] Criminal Procedure Code (CPC) Chapter XXXII, Sections 328, 329, 330, 33 1,332, 333, 334, 335, 336, 337, 338, 339, 340. Section 328 defines 'cause of death', Section 329 deals with duty of police officer to investigate death, Section 330 deals with duty of officer to arrange for post-mortem examination in certain cases, Section 331 deals with Post-mortem examination of body, Section 332 deals with Report of Government Medical Officer, Section 333 deals with Duty of Magistrate on receipt of report, Section 334 deals with Inquiry into cause of death of a person in custody of police or in any asylum, Section 335 deals with Powers of Magistrate, Section 336 deals with Magistrate may view body, Section 337deals with Inquiries to be made by Magistrate, Section 338 deals with Evidence and finding to be recorded, Section 339 deals with Power of Public Prosecutor to require inquiry to be held, and Section 340 deals with Admissibility of medical report in certain cases.

[48] Criminal Procedure Code (CPC) Chapter XXXII, Sections 328.

[49] Nadesan, K., (1997). "The importance of the medico-legal autopsy," *Malaysian J Pathol*, Vol. 19, No. 2, p. 106.

[50] *Ibid.*

to inquests will undergo post-mortem (e.g. road accident and murders). In other sudden and unexpected deaths, if there are sufficient evidence and information obtained from inquest that satisfy the Coroner or the Magistrate on the cause, manner and circumstances of death, post-mortem will not be conducted.[51] Deaths subjected to an inquest are as follows:[52]

1. All unnatural and suspected unnatural deaths, e.g. murders, all types of accidents and suicides;
2. Deaths apparently from natural causes but where the exact medical cause of death is not known;
3. Deaths following anaesthesia, surgery or any medical investigative procedure;
4. Deaths in custody such as in police custody, remand prison, prisons, rehabilitation centres, detention camps, etc.
5. Deaths in mental institutions, asylums, etc.
6. Deaths associated with pregnancy, abortion, childbirth etc.
7. Deaths related to occupational diseases.

Inquest is preceded post-mortem. The purposes of conducting post-mortem are to:[53]

1. Ascertaining or confirming the cause of death;
2. Identifying the deceased;
3. Documenting the injuries, their description, nature and distribution;
4. Ascertaining whether the injuries and their distribution are consistent with a given history;
5. Reconstructing the event of death when a proper eye witness account or a history is not available;
6. Deciding whether to accept or refute an eye witness account;
7. Discovering any other underlying cause or disease that has contributed to the death;
8. Ascertaining the possibility of any voluntary act that the deceased may have performed after sustaining the injury;
9. Ascertaining whether the injuries found were inflicted before or after death;
10. Collecting trace materials on the victim which may help to solve a crime such as tracing a hit and run vehicle, arresting a rapist murderer etc.

In Malaysia, death certificate will be issued upon death. A death certificate is necessary to solve many legal matters such as inheritance and succession to property,

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[51] *Ibid.*

[52] Knight, B. H. (1983). "The Coroner's Autopsy." Churchill Livingstone, p. 2-42, as cited in Nadesan, K., (1997). "The importance of the medico-legal autopsy," *Malaysian J Pathol*, Vol. 19, No. 2, p. 106.

[53] Knight, B. H. "The Forensic Autopsy." In: Forensic Pathology. Edward Arnold, 1995, p. 1-46, as cited in Nadesan, K., (1997). "The importance of the medico-legal autopsy," *Malaysian J Pathol*, Vol. 19, No. 2, p. 106-107.

probate, the collection of insurance policies and pensions, settlement of business matters and also the remarriage of the remaining spouse.[54] Thus, positive and correct identification of the deceased is critically important. It reflects a moral obligation to the concerned agency (e.g. hospital) to release the deceased to the family. If the deceased are not correctly and positively identified, the death cannot be certified and hence other legal matters (e.g. insurance claims, inheritance) cannot be resolved.

In connection to humanitarian reason, identification of victims is important to lessen the grief experienced by the family members, relatives and friends. Furthermore, additional relief may be afforded to a family who learns that an unknown body is not the remains of a missing relative.[55] Positive identification of the victim will enable the family members to proceed with last rites (e.g. buried or cremated).[56] Looking at the data collected from Hospital Kuala Lumpur (HKL) and University Malaya Medical Centre (UMMC), unidentified dead bodies were not only those Malaysian, but also foreigners, and they were include Indonesian, Bangladesh,[57] and Vietnamese.[58] Their unclaimed and unidentified dead bodies were either sent for cremation or buried. A question that might be posed here is whether their family or next-of-kin is informed or traced. To reach to their family is another unsolved matter especially when the identity of the dead bodies was not positively identified.

When deaths occurred (from crimes or disaster), various agencies will come forward to initialize search and assistance, and they are such as media, police, and voluntary bodies. In a murder case of Nurin for example, several organizations including the mainstream media and NGOs were collaborated for extensive search of the perpetrator and the victim.[59] An additional relief was also offered to the family by conducting massive search of the perpetrator. While, in disaster which claimed massive fatalities (e.g. Highland Towers

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[54] Alhabshi, S.F., and Nambiar, P., (1995). "The Contribution of Forensic Odontology in the Highland Towers Condominium Disaster," *Annals Dent. Univ. Malaya*, Vol. 2, p. 25.
[55] *Ibid.*
[56] *Ibid.*
[57] See Appendix 2 (d) at page 125 (highlighted in green).
[58] See Appendix 3 (a) at page 132 (highlighted in green).
[59] See Note 35, at page 58.

Condominium disaster), international collaboration with other countries (e.g. Singapore and China) alongside with their expert assistance was took place to minimize and assist in disaster management and victim identification.[60] In any criminal or disaster case involving dead person, the bereavement of the relatives is the matter that has to be put into priority. Police and media for instance, will continuously support and update the relatives on the latest information.

The researcher believes that there are more unidentified dead bodies submitted each year in the government hospital and teaching hospitals, include those institutions that are not mention in this research. Nowadays, homicides are a common scenario. When death occurs, the identity of the victim is a question that puzzles everyone. This situation deepens when no evidences found that can relate to the deceased. Worst still, the next-of-kin will be difficult to trace.

The researcher is of the view that, identification of dead bodies is imperative by making use of all possible means (e.g. available scientific analysis) in an attempt to achieve positive identification. Therefore, close collaboration between police, experts, and media is critically important to minimize the legal and humanitarian difficulties especially faced by the next-of-kin of the deceased.

[60] See Note 36, at page 58.

# CHAPTER 4

# ADMISSIBILITY OF SKULL-PHOTO EVIDENCE IN COURT

## 4.1 INTRODUCTION

This chapter seeks to address the legal admissibility of skull-photo evidence in court. The issue to be posed is whether the court can accept skull-photo evidence, when no other scientific evidence available. This may be the legal obstacle encountered that limits the admissibility of skull-photo evidence. Generally, provision of law on scientific evidence is governed by Section 45 of the Malaysian Evidence Act 1960. This provision must be fulfilled for the requirement of scientific evidence to be admissible in the court of law.

First and foremost, scientific evidence refers to any biological evidence encountered at a crime scene (e.g. blood, fingerprint, semen, skeletal remains) and be analyzed by a scientific method or analysis[1] to generate a fact (e.g. identity of the victim, crime event reconstruction). Analyzing scientific evidence will usually involve a routine laboratory procedure. For example, a dead body was found in a bush and was suspected to be a reported missing person by a family. Deoxyribonucleic acid (DNA) sample from the dead body and the family was collected for paternity testing. The DNA result of both samples is compared and if it is match, it is confirmed that the dead body was the relative of the family. In a separate case for instance, when skeletal remains discovered, the skull (biological evidence) will be sent to laboratory to be superimposed with submitted photograph of suspected missing or dead person, hoping to get a match.

In a criminal law case such as murder, scientific evidence (e.g. blood, hair, fiber) will be collected and some laboratory work is performed to generate a result which can link the victim and criminal to the case, reconstruct the crime event and to provide relevant information of the case itself. Therefore, scientific evidence has the potential to supply vital

[1] *Oxford Advanced Learner's Dictionary of Current English*, 6th edition, Oxford University Press, p. 1052.

information about who is the perpetrator, who is the victim, and how the crime occurs. All the possible information scientific evidence can provide can be accepted and taken before the court to resolve a criminal case.[2]

There are many different scientific evidences analyzed by different scientific methods. These include DNA evidence, fingerprint evidence, and dental evidence. These evidences generally accepted as valid and are admissible in court of law.[3] The presence of this evidence can either rebut or confirm the identity of an individual in question. DNA, fingerprint, and dental analysis are a reliable technique of human identification and can confirm an individual identity with high certainty.[4] The analyses produce no doubt of who the individual is.

Skull-photo evidence is also an important scientific evidence. Apart from the aforementioned scientific evidences, skull-photo evidence served as corroborative evidence to support and strengthen other scientific evidences such as DNA, fingerprint, and dental evidence, especially when the presence of these evidences were limited and insufficient to confirm the identity of a victim. Therefore, this chapter will clarify the legal admissibility of skull-photo evidence in court.

## 4.2 LAW RELATING TO EXPERTS AND SCIENTIFIC EVIDENCE

The reception of expert evidence is governed by Section 45 to Section 51 of the Malaysian Evidence Act 1950. The expert evidence will have to conform to this Act to ensure admissibility in a court of law. These provisions define the meaning of "expert" and

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[2] Terrence F. Kiely. *Forensic Evidence: Science and the Criminal Law*, 2nd edition, Taylor & Francis, CRC, p. 53.
[3] Hinkle, Jachimowicz, Pointer, and Emanuel (2005). "*Scientific evidence: an introduction*," (408) 217-0356, San Jose, CA; Chandra Shekar, B. R., Reddy, C., (2009). "Role of dentist in person identification," *Indian J Dent Res*, Vol. 20, Issue 3, p. 356.
[4] Michael, N. Sobel. "*Forensic Odontology*." Chapter 70, p. 655; Hinkle, Jachimowicz, Pointer, and Emanuel (2005). "*Scientific evidence: an introduction*," (408) 217-0356, San Jose, CA

lays out the law pertaining to expert evidence in Malaysia. In other words, these provisions are a fundamental rule in governing the admission of expert evidence in court. These provisions are very important as it acknowledges and recognizes the role and duty of expert in court.

Who is an "expert"? There are many interpretations of "expert". Expert can be interpreted as one who has special skill in a particular subject or matter, and this special skill is absent in layperson. This is where the expert can be distinguished from the average layperson. In Oxford dictionary, "expert" is defined as a person with special knowledge, skill or training in something.[5] In another definition by Powell, a social scientist:[6]

> An expert is one who has devoted time and studies to a special branch of learning and is especially skilled on the points in which he is asked to state his opinion.

However, legal interpretation of an expert is provided in Section 45 of the Evidence Act 1960 which reads:[7]

> 1) When the court has to form an opinion upon a point of foreign law or of science or art, or as to identify or genuineness of handwriting or finger impressions, the opinions upon that point of persons specially skilled in that foreign law, science or art, or in questions as to identity of genuineness of handwriting or finger impressions, are relevant facts.
>
> 2) Such persons are called experts.

Section 46 of the Evidence Act relates to facts bearing upon opinions of experts.[8]

> Facts not otherwise relevant are relevant if they support or are inconsistent with the opinions of experts when such opinions are relevant.

Pertaining to relevancy of handwriting opinion, Section 47 of the Evidence Act 1950 lays down:[9]

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[5] *Oxford Advanced Learner's Dictionary of Current English*, 6th edition, Oxford University Press, p. 406.
[6] Nabar, B. S., (2001). *"Forensic Science in crime investigation,"* 3rd edition, Asia Law House Hyderabad, p. 358.
[7] Section 45 of Evidence Act 1950.
[8] Section 46 of Evidence Act 1950.
[9] Section 47 of Evidence Act 1950.

> When the court has to form an opinion as to the person by whom any document was written or signed, the opinion of any person acquainted with the handwriting of the person by whom it is supposed to have been written or signed, that it was or was not written or signed by the person, is a relevant fact.

In regards to grounds of opinion, Section 51 of the Act states:[10]

> Whenever the opinion of any living person is relevant, the grounds on which his opinion is based are also relevant.

Therefore, an expert is a person who has skill and knowledge in a particular field of study (e.g. engineers, pathologist, astronomer, and chemist), and his qualification is recognized and acknowledged. The qualifications he possesses enable him to give opinion, whereas the average layperson is incompetent to do so.[11]

Apart from the above-mentioned provisions, there is a special provision in Criminal Procedure Code which regulate the admittance of expert evidence. Section 425 of Criminal Procedure Code relates to the admittance of the expert's report and lays down:[12]

> (1) Any document purporting to be a report under the hand of any of the persons mentioned in subsection (2) upon any person, matter or thing examined or analysed by him or any document purporting to be a report under the hand of the Registrar of Criminals upon any matter or thing relating to finger impressions submitted to him for report may be given in evidence in any inquiry, trial or other proceeding under this Code unless that person or Registrar shall be required to attend as a witness;
>
> (a) by the Court; or
> (b) by the accused, in which case the accused shall give notice to the Public Prosecutor not less than three clear days before the commencement of the trial:
>
> Provided always that in any case in which the Public Prosecutor intends to give in evidence any such report he shall deliver a copy of it to the accused not less than ten clear days before the commencement of the trial.
>
> (2) The following are persons to whom the provisions of this section apply:

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[10] Section 51 of Evidence Act 1950.
[11] Nabar, B. S., (2001). *"Forensic Science in crime investigation,"* 3rd edition, Asia Law House Hyderabad, p. 360.
[12] Section 425 of Criminal Procedure Code.

(a) officers of the Institute for Medical Research;
(b) Government Medical Officers;
(c) chemists in the employment of any Government in Malaysia or of the Government of Singapore;
(d) any person appointed by the Minister by notification in the Gazette, to be a Document Examiner;
(e) Inspector of Weights and Measures appointed as such under any written law relating to weights and measures in force in Malaysia; and
(f) any person or class of persons to whom the Minister by notification in the Gazette declares that the provisions of this section shall apply.

(3) The persons referred to in subsection (2) and the Registrar of Criminals are by this Code bound to state the truth in reports made under their hands.

Now that scientific evidence is outside the world of law professionals, the prosecution and the defense will use qualified expert witnesses to assist the court in achieving final judgment. Expert opinion is required to clarify certain facts especially when it deals with scientific information, as it is literally beyond the knowledge and experience of a judge. This is the situation of where the function of expert evidence is critical. According to Augustine Paul:[13]

> There are however cases in which Court is not in a position to form a correct judgment without help of persons who have acquired special skills or experience on a particular subject, e.g. when the question involved is beyond the range of common experience or common knowledge or when special study of a subject or special training or special experience therein is necessary. In such cases, the help of experts is required. In these cases, the rule is relaxed and expert evidence is admitted to enable the court to come to a proper decision.

There are 4 categories of expert evidence admissible in a court. It includes foreign law, science or art, handwriting, and finger impression.[14] Obviously, in this research, expert evidence is fall under category of science or art. The science or art is capable of a wide

[13] Paul, S.A., (2003). *"Evidence: Practice and Procedure,"* Pelanduk Publication, p. 324.
[14] Paul, S.A., (2003). *"Evidence: Practice and Procedure,"* 3rd edition, Malayan Law Journal Sdn. Bhd, p. 448-458.

interpretation.[15] As stated by Raja Azlan Shah J (as the Royal Highness then was) in *Chandrasekaran v Public Prosecutor:*[16]

> The expression 'science or art' is elastic enough to be given a liberal interpretation. If the *Hanumanth* decision was based on the premise that typewriting was specifically mentioned in Section 45, then equally there is no mention of handwriting or foot-print or telephony and yet the evidence of handwriting, foot-print or telephone experts have been held admissible. So also of ballistic or medical experts who too have not been mentioned in Section 45.

In view of the above, similarly, skull-photo superimposition evidence has not been mentioned specifically in the Section 45. However, it covers in the category of 'science or art.'

To be qualified as expert, court has outlined several criteria. The expert must be skilled in his particular field of study. The skill may be acquired by special study, academic qualification, or by experience.[17] The knowledge the expert posses are very important to furnish the court with scientific information to provide opinion for the matter under inquiry.[18] Absence or lack of required skill in regards to qualification and experience will affect the weight of the evidence. While, lacking in knowledge to give opinion for the matter under inquiry will rendered the evidence inadmissible.[19] As emphasized by Suffian LP in *Public Prosecutor v Muhamed bin Sulaiman:*[20]

> .....while the expert must be skilled, he need not be so by special study, he may be so by experience, and the fact that he has not acquired his knowledge professionally goes merely to weight and not to admissibility.

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[15] *Ibid.*, p. 450.
[16] *Chandrasekaran v Public Prosecutor* [1971] 1 MLJ 153.
[17] Paul, S.A., (2003). *"Evidence: Practice and Procedure,"* 3rd edition, Malayan Law Journal Sdn. Bhd, p. 459.
[18] *Ibid.*
[19] *Ibid.*
[20] *PP v Muhamed bin Sulaiman* [1982] 2 MLJ 320.

In another case, it was held in *Junaidi bin Abdullah v Public Prosecutor*[21] that the specialty of the skill required of an expert witness would depend on the scientific nature and complexity of the evidence sought to be proved. According to Suffian LP:[22]

> The more scientific and complex subject matter, the more extensive and deeper will the court be required to inquire into his qualification or experience in the particular field, trade or profession. But in the final analysis, it is for the trial judge himself as both judge of fact and law to determine the weight to be attached to such evidence notwithstanding the outstanding qualification or experience (or the lack of it) of the expert.
>
> The lack of qualification or experience on the part of the expert will necessarily affect the weight of the evidence rather than the admissibility. But where the evidence is of a complex and scientific nature, the absence of both qualification and experience can certainly affect admissibility. No hard or fast rule should be laid down on the issue of competency of an expert witness. In an uncomplicated matter, considerable laxity should however be applied in practice.

Apart from skilled expert, semi-skilled and semi-professional persons also may qualify as expert. As in *Kong Nen Siew v Lim Siew Hong*,[23] it was held that semi-qualified psychiatrist nurse was a person specially skilled within the meaning of section 45 of Evidence Act 1950. As asserted by Smith J in *Regina v Majana bin Sumalog*:[24]

> It is unwise to reject semi-skilled or semi-professional opinion. The court should adapt itself to the circumstances of the country and take advantage of such knowledge as may be available.

It is clear that in cases involving scientific explanation on a matter under inquiry, a favour of expert opinion is needful. It should be bare in mind that, function of an expert is limited to only giving opinion based from his scientific analysis to assist Court to reach to a judgment. In light of this, assertive statements have been brought up in regards to the limitation of duty of expert evidence in Court. In *Ong Chan Tow v R*,[25] it was stated that:

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[21] *Junaidi bin Abdullah v Public Prosecutor* [1993] 3 MLJ 217.
[22] *Ibid.*
[23] *PP v Muhamed bin Sulaiman* [1982] 2 MLJ 320.
[24] Paul, S.A., (2003). "Evidence: Practice and Procedure," Pelanduk Publication, p. 332.
[25] *Ong Chan Tow v Regina* [1963] 1 MLJ 160.

> Such an expert should not be asked to give his conclusions on matters which are eminently matters for the Court to decide; otherwise he would tend to arrogate to himself the functions of the Court. The motoring expert is there to help the Court on technical and mechanical matters, not to draw inferences which even a layman can equally well draw.

Raja Azlan Shah in *Wong Swee Chin v Public Prosecutor*[26] has also aptly said that:

> But, except on purely scientific issues, expert evidence is to be used by the court for the purpose of assisting rather than compelling the formulation of the ultimate judgments. In the ultimate analysis it is the tribunal of fact, whether it be a judge or jury, which is required to weigh all the evidence and determine the probabilities. It cannot transfer this task to the expert witness, the court must come to its own opinion.

Lord President Cooper in the case of *James Pennycook Davie v. The Lord Provost*,[27] said that the duty of experts:

> is to furnish the judge or jury with the necessary scientific criteria for testing the accuracy of their conclusions, so as to enable the judge or jury to form their own independent judgment by the application of these criteria to the facts proved in evidence.

Based from the above statement, it is clear that the assistance of an expert opinion is important to assist judge in achieving a final and satisfactory conclusion. When the expert is required to appear in court, the expert will use his knowledge and opinion of a matter under inquiry based on his analysis. The court will form its own judgment after scrutinizing the presented evidence by the expert. In short, the expert gives his opinion while court makes decision.

Above has set out the requirements towards admissibility of any scientific evidence by the expert opinion. Expert is required attend to the court when there is a necessity to clarify a scientific fact. This is provided in Section 425 of Criminal procedure Code (CPC) which reads:[28]

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[26] *Wong Swee Chin v. Public Prosecutor* [1981] 1 MLJ 212.
[27] *Chan Kwee Fong v Public Prosecutor*, in the matter of Criminal Trial No: 45-1-2003, before the High Court of Malaya in Kuala Terengganu, Criminal Appeal No.: T-05-48-2005, in the Court of Appeal of Malaysia, p. 24.
[28] Section 425 of Criminal Procedure Code.

> Any Court may at any stage of any inquiry, trial or other proceeding under this Code summon any person as witness, or examine any person in attendance though not summoned as a witness, or recall and re-examine any person already examined, and the Court shall summon and examine or recall and re-examine any such person if his evidence appears to it essential to the just decision of the case.

It is the duty of an expert to provide and convey his opinion effectively about particular evidence. In skull-photo superimposition for example, the skull-photo evidence produced by expert when used as prosecution evidence must be able to opine assertively that the victim was identified by the superimposition technique. The confidence of the result of skull-photo superimposition is very much depended on the experience and expertise of the expert involved. Finally it will be up to the court to make ultimate decision of the presented case.

### 4.3 SKULL-PHOTO EVIDENCE AS CORROBORATIVE EVIDENCE

In forensic investigation, there are several classifications of evidences, and they are trace evidence,[29] direct evidence,[30] and circumstantial evidence.[31] These evidences provide a leads to investigator in criminal investigation and to link a victim or criminal to the commission of crime. In this research, the researcher will focus on skull-photo evidence which represent as corroborative evidence, and will be elaborated further below.

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[29] Trace evidence is a microscopic material discovered as evidence. Because of its minute nature, it can be easily cross-transferred from one surface to another without detection by criminal. Trace evidence are such as fiber, human hair, paint, glass, and pollen, Grieve, M., and Houck, M.M., "Introduction," in Houck, M.M., (2004). *"Trace evidence analysis. More cases in mute witness."* Elsevier Academic Press, USA, p. 1-2.

[30] Direct evidence is proof that does not require an inference, such as the testimony of someone who claims to have personal knowledge of a fact, *Ibriham Kiswani v Aaron Cunningham*, Case No. 05 C 4559, In The United States Court For The Northern District Of Illinois Eastern Division, p. 4.

[31] Circumstantial evidence is evidence of relevant fact, i.e. facts from which the existence or non existence of facts in issue may be inferred, Blackstone's Criminal Practice (1991), p. 1674-1675, as cited in *Mohd. Ya'cob b. Dimyati v Public Prosecutor*, in the Court of Appeal of Malaysia, Held in Federal Territory of Putrajaya, Criminal Appeal No. N-05-44-2002, p. 67.

A detailed account on skull-photo superimposition technique to identify human skull and its acceptance as corroborative evidence in establishing human identity has been provided in earlier chapter. Besides, this technique was used as a supplement to other scientific technique (e.g. DNA analysis and dental analysis) to further support and enhances the reliability of human identification.[32] According to Walton;[33]

> Corroborative evidence can be broadly defined as any evidence that further supports some evidence that already exists in a case. The evidence that is already there can be called the primary evidence, and the evidence that supports it can be called the secondary evidence. What is meant when it is said that the secondary evidence supports the primary evidence is that the secondary evidence increases the probative weight of the primary evidence.

Based from the above statement, corroborative evidence is any evidence that supports or confirms another evidence by the witness. In a murder case for instance, a witness saw the perpetrator fled away from a crime scene. Fingerprint evidence collected from the scene was also associated with the perpetrator, and therefore support the witness testimony. In a different scenario, a collection of human skeletal remains discovered in a crime scene. Articles (e.g. clothing, watch, and shoe) were also discovered with the remains. With these evidences and information supplied, an investigator may able to trace any reports of missing individual fitted with the description of the discovered human remains. Identification by personnel effects cannot be used as a sole method as it may match with other living people. To precisely identify the deceased, anthropological analysis, DNA analysis and dental analysis can be conducted to determine the sex and age of the deceased, and the result can be compared with information obtained from the relatives.

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[32] Shahrom, A.W., Vanezis, P., Chapman, R.C., Gonzales, A., Blenkinsop, C., and Rossi, M.L., (1996). "Technique in facial identification: computer-aided facial reconstruction using a laser scanner and video superimposition," *Int J Legal Med*, Vol. 108, p. 194-200; Noorazma, S., and Shahrom, A.W., (2007). "Identification of a charred skull: a case report," *Journal of Forensic Medicine and Toxicology*, Vol. 24, No. 2, p. 15-19; Bilge, Y., Kedici, P.S., Alakoc, Y.D., Ulkuer, K.U., and Ilkyaz, Y.Y., (2003). "The identification of a dismembered human body: a multidisciplinary approach," *Forensic Science International,* 137, p. 141-146; Jayaprakash, P.T., Srinivasan, G.J., and Amravaneswaran, M.G., (2001). "Cranio-facial morphoanalysis: a new method for enhancing reliability while identifying skulls by photo superimposition," *Forensic Science International*, Vol. 117, p. 122-143, Basauri, C., (1967). "A body identified by Forensic Odontology and superimposed photograph," *Int. Criminal Police Review*, 204, p. 37-43.

[33] Walton, D., *"Argument Visualization Tools for Corroborative Evidence,"* University of Windsor, Windsor ON N9B 3Y1, Canada, p. 1.

Skull-photo superimposition technique is another approach that can be employed to further support evidence that have already existed for positive identification. If the superimposed skull and the photograph exhibited a good match, the evidence can support and strengthen the other evidences. To put it in a nutshell, the presented corroborative evidence enhance the credibility of other existing evidence.

Having said that skull-photo evidence is corroborative evidence, skull-photo superimposition technique cannot be taken as a sole method of identification.[34] Skull-photo superimposition technique was always accompanied with other scientific analysis.[35] From the case report prepared by Profesor Dr. Shahrom Abdul Wahid, a Forensic Pathologist of University Kebangsaan Malaysia Medical Centre (UKMMC), unknown remains found in an orchard was positively identified by superimposing the skull with the photograph of the suspected dead person. The superimposition result was match and the result was confirmed with the discovery of dentures and "Chanel" earring which were positively associated with the deceased.[36] A several other cases have also been documented on the application of skull-photo superimposition in combination with other scientific analysis for identification purpose.[37]

Skull-photo evidence as corroborative evidence was supported by many scholars.[38]

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[34] Interview with Professor Dr. Shahrom Abdul Wahid, Forensic Pathologist of University Kebangsaan Malaysia Medical Centre (UKMMC), on 28th June, 2009.

[35] *Ibid.*

[36] Noorazma, S., and Shahrom, A.W., (2007). "Identification of a charred skull: a case report," *Journal of Forensic Medicine and Toxicology*, Vol. 24, No. 2, p. 15-19.

[37] See Note 32, at page 76.

[38] Koelmeyer, T.D., (1982). "Videocamera superimposition and facial reconstruction as an aid to identification," *The American Journal of Forensic Medicine and Pathology*, Vol. 3, No. 1, p. 45; Shahrom, A.W., Vanezis, P., Chapman, R.C., Gonzales, A., Blenkinsop, C., and Rossi, M.L., (1996). "Technique in facial identification: computer-aided facial reconstruction using a laser scanner and video superimposition," *Int J Legal Med*, Vol. 108, p. 200; Noorazma, S., and Shahrom, A.W., (2007). "Identification of a charred skull: a case report," *Journal of Forensic Medicine and Toxicology*, Vol. 24, No. 2, p. 19; Bastian, R.J., Dalitz, G.D., and Woodward, C., (1986). "Video superimposition of skulls and photographic portraits-a new aid in identification," *Journal of Forensic Science*, Vol. 31, No. 4, p. 1373; Jayaprakash, P.T., Srinivasan, G.J., and Amravaneswaran, M.G., (2001). "Cranio-facial morphoanalysis: a new method for enhancing reliability while identifying skulls by photo superimposition," *Forensic Science International*, Vol. 117, p. 140-141; Sivaram, S., and Wadhera, C.K., (1977). "Identity from a skeleton-a case study," p. 160, Institute of Criminology and Forensic Science, 4-E Jhandewalan Extension, Rani Jhansi Road, New Delhi-110055; Scully, B., and Nambiar, P., (2002). "Determining the validity of Furue's method of craniofacial superimposition for identification." *Annal Dent Univ Malaya*, Vol. 9, p. 21.

The technique of skull-photo superimposition can be used in combination with other analysis when confirmatory evidences such as DNA, fingerprint, and dental evidence were unavailable or insufficient.[39] Critically, skull-photo evidence as an additional evidence can increase the percentage of identification.[40]

The usefulness and advantages of skull-photo superimposition technique as a new and good technology was also highlighted in investigation stage.[41] At the investigation level, the technique of skull-photo superimposition can expedite the investigation process by the police, particularly in identifying unidentified dead bodies especially when no witness are willing to come forward to assist the investigation. This information of prosecution evidence (skull-photo evidence) can be admitted in court to link the story of the committed crime with the suspected victim and criminals. Moreover, skull-photo evidence can further corroborate and strengthen prosecution case especially in a case where DNA evidence is not sufficiently cogent (e.g. maybe due to less or no DNA sample available).[42]

In Malaysia, skull-photo superimposition has been tested in a number of cases. A murder cases reported sometimes around 1992 was a murder of 4 members in a gang group due to internal conflict. The 4 victims were believed to be murdered somewhere in 1991. Interrogation of the gang members led to a discovery of their bodies at the same locations.[43] First discovery of human skeletal remains was at a shallow grave at a hill at Mount Erskin Road, Penang. Superimposition was carried out by superimposing the skull with the photograph of suspected deceased.[44] Examination of the bones revealed that the

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[39] Interview with Professor Dr. Shahrom Abdul Wahid, Forensic Pathologist of University Kebangsaan Malaysia Medical Centre (UKMMC), on 28th June, 2009, and Mr. Amidon Anan, former Head of Crime Scene Investigation (CSI) and are now a Consultant of Noble Forensic Investigation (NFI) and Service, on 15th December, 2009.

[40] Interview with Mr. Amidon Anan, former Head of Crime Scene Investigation (CSI) and are now a Consultant of Noble Forensic Investigation (NFI) and Service, on 15th December, 2009.

[41] Interview with Mr. Mohamed Mustafa P Kunyalam, Deputy Public Prosecutor, on 20th November, 2009, at Pejabat Timbalan Pendakwaraya Negeri Selangor , Shah Alam, Selangor.

[42] *Ibid.*

[43] Singh, A., (2005). "Admissibility of cranio-facial superimposition evidence as a means of forensic identification," Dissertation (M. CJ), Faculty of Law, University of Malaya, p. 40.

[44] Superimposition was conducted by Professor Masatsugu Hashimoto, Assistant Professor of Forensic Odontology and Physical Anthropology, Tokyo Dental College, Japan.

victim was a male and belongs to a Mongoloid group. However, the identity of the deceased cannot be verified by superimposition technique,[45] and as stated by Professor Masatsugu:[46]

> It was impossible to get the conclusion by the superimposition of these two photographs. I would recommend to take the photo of the skull under the same condition which antemortem photograph was taken and then superimpose again.

Interrogation of the same gang member led police to discover another human skeletal remains at unmarked grave at Chinese Cemetery Kwangtuang, Mount Erskine, Penang. The submitted photograph of the alleged victim, Oii Tyan Foo was examined for facial characteristic. From the photograph, it was observed that the victim had a narrow forehead, broad nose, and longer lower jaw and these facial characteristics were correspond with the characteristics of skull. Superimposition of the skull with the photograph was well superimposed, and the expert opined that there was a high probability that the skull belonged to the alleged victim, Oii Tyan Foo.[47]

Another murder victim believed to be that of Tan Kiat Theng was also discovered at the same location. Examination of the bones showed that that the victim was a male, belongs to a Mongoloid group, estimated height was 173 ± 3 cm, and estimated age was 20's to early 30's. The submitted photograph of the alleged victim was examined for facial characteristic, and victim had a prominent lower jaw and narrow nose. These facial characteristics were corresponding well with the characteristics of skull. Vertical superimposition of the skull with the photograph was well-superimposed, particularly at the eyebrow, nose, eye, mouth, and chin region. Horizontal superimposition however did not exhibit a good match, maybe it was attributed to the slight difference in the rotation angle of

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[45] Singh, A., (2005). "Admissibility of cranio-facial superimposition evidence as a means of forensic identification," Dissertation (M. CJ), Faculty of Law, University of Malaya, p. 41-43.
[46] *Ibid.*
[47] *Ibid.*, p. 43-45.

the skull during superimposition process. The expert opined that there was a high probability that the skull belonged to the alleged victim, Tan Kiat Theng.[48]

Somewhere in 1993, a celebrated case which startled the country where a newly wed couple was beheaded on a separate occasion by the Mona Fandey gang.[49] Interrogation had led the police to the site where they had buried the two victims. Skeletal remains of the victims were excavated from the said location and examined. As to the earlier case, the skulls were examined by Professor Masatsugu. Analysis of the skull and pelvic bone to ascertain the age and sex indicated that it was of female and male victim, and the information was match with the two deceased. Both skulls were superimposed with the submitted photograph of the husband and wife. Superimposition of the skulls of the deceased with the photographs was perfectly match, with eyebrow, ear, mouth, teeth (canine and upper teeth), eye, nose, and chin region were corresponded with one another. The analysis thus confirmed that the skeletal remains discovered were belong to the couples. The evidences were not produced before the court since the accused has been earlier charged and convicted for the murder of State Assemblyman YB Dato' Haji Mazlan b. Idris.[50]

When admitted to court in criminal trial for instance, skull-photo evidence as corroborative will make the other evidence stronger and strengthen the testimony of the first witness. In other words, corroborative evidence boosts up the value of another evidence (e.g. DNA evidence, dental evidence) higher. Subsequently, corroborative evidence may enable a charge against the perpetrator to be made and to assist the court in deciding guilt. In the case of *Doney v The Queen* (1990) 171 CLR 207, High Court said:[51]

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[48] *Ibid.*, p. 47-50.
[49] *Bernama*, Saturday, December 04, 2004. Mona Fandey, was the stage name of pop singer Maznah Ismail, who was later known to be a bomoh. She was hanged in November 2001 along with her husband, Mohd Affandi Abdul Rahman, and one Juraimi Hussin after they were convicted of murdering a Pahang assemblyman, Datuk Mazlan Idris.
[50] See Note 43, p. 55-59.
[51] *Doney v The Queen* [1990] 171 CLR 207, p. 211, as cited in *R v Franco* [2009] SASC 370, p. 8.

> It is not necessary that corroborative evidence, standing alone, should establish any proposition beyond reasonable doubt. In the case of an accomplice's evidence, it is sufficient if it strengthens that evidence by confirming or tending to confirm the accused's involvement in the events as related by the accomplice.

The important elements of corroborative evidence are it confirms, supports or strengthens other evidence. It must be independent evidence which tends to confirm in some material particular the evidence that the crime has been committed and that the accused committed the crime.

## 4.4 APPLICATION OF SKULL-PHOTO EVIDENCE IN COURT PROCEEDING

This section presents a case on the admittance of skull-photo as evidence in court in a criminal trial in Malaysia. Two cases will be presented. The first case was a murder case of 18 year old schoolgirl, Jong Liu Chin.[52] While the second case was the murder of Sabi'ul Malik b. Shafiee, also known as Along.[53]

### CASE 1

The appellant, John Nyumbei was charged of committing murder of Jong Liu Chin on 16th March, 1993 at between 5.30 am and 7 p.m, at Sebuku, Bau. He was charged under offence punishable under section 302 of the Penal Code.[54]

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[52] See Note 41, p. 50-55. On 16th March, 1993, at Sebuku, Bau, Sarawak, an 18 year old schoolgirl, Jong Liu Chin was reported missing by her family as she did not returned home from school. Police investigation commenced thereafter, and a few days after her missing, a headless body still in full school uniform was found in a bush and suspected to be the schoolgirl who was reported missing. The victim was believed to be sexually accosted and then beheaded. The skull of the deceased was discovered 3 days later after the discovery of the body. The suspect has removed her facial skin, brain, and all other tissues.

[53] Along was a vocalist of a Malaysian band, Spoon.

[54] *John Nyumbei v Public Prosecutor* [2007] 2 CLJ p. 509.

The facts of the case were on the 16th March 1993 ASP Sayang Kavang (PW4) was informed by Sgt. Jien (PW20) about the finding of a corpse at the scene of the crime at Sebuku, Bau. On arrival there PW4 found a headless body donned in a blue-colored school uniform with a name tag of "Jong Liu Chin" (the deceased) pinned on it. In a school found nearby, he also found some books with the name of the deceased written on them. On the same night,the deceased was sent to the mortuary at the Sarawak General Hospital where a post-mortem was conducted on it.[55]

The appellant was arrested on 18th March, and gave a good cooperation with police during interrogation and led police to the discovery of a knife which used to murder the deceased. Interrogation has also led the police to the discovery of a human skull, suspected to be that of the deceased.[56]

Post-mortem of the body conducted by Dr. Sardar Jehan stated that the cause of death as transaction of the spinal cord due to decapitation of the head. Examination of the private part showed no evidence of rape, but however there was an evidence of sexual intercourse as large amount of sperm was deposited around the private part of the deceased.[57]

The human skull was examined by Prof. Dr. Masatsugu Hashimoto, a Professor in Forensic Odontology and Physical Anthropology at the University of Tokyo. Sex and age were determined by examination of the skull. The result was match to that of the deceased, that is female and 17±2 years old. Teeth characteristics from the skull were compared with the teeth from submitted photograph, and both showed the same features (e.g. slightly slanted lateral incisor, space between upper left lateral incisor and canine). Superimposition of the tooth region showed a perfect match. Size of the corresponding tooth and their

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[55] *Ibid.*, p. 513-514.
[56] *Ibid.*, p. 514.
[57] *Ibid.*

positional relationship were exactly superimposed. According to Prof. Dr. Masatsugu Hashimoto, frequency of a person with these same dental condition and features were very few and zero, thus concluded that the skull belonged to the deceased. Similarly, vertical superimposition between the photograph and parts of the skull (e.g. top of head, eyebrow, eye, nose, and ear region) were well-corresponded. Superimposition result accompanied with the unique features of teeth has concluded that the skull was belonged to the victim, Jong Liu Chin. The evidence was accepted by High Court of Kuching during the subsequent trial of the murder.[58]

The appellant, in his cautioned statement has admitted that he had killed the deceased at Sebuku, Bau, and then had sexual intercourse with the corpse. The appellant had also taken the deceased's ring, earrings, and some money from her purse. In his sworn testimony, the appellant had admitted that he killed the deceased on 16th March 1993 at Sebuku Road, Bau. He also admitted that he had beheaded the deceased and had carried deposited the head to other place. He then peeled off the head skin and threw the skull away into a jungle at Kampung Opar, Bau.[59]

Counsel for the appellant put forth a defence of insanity for grounds of appeal. In relation to this matter, Dr. Abang Bennett Taha (DW2), a consultant psychiatrist attended the appeal for examination. During the course of the examination, he interviewed the appellant and the appellant's father. From the interview, DW found that during the commission of the crime, the appellant was rational and coherent in his speech and showed the appropriate emotional responses. Apart from that, while confronting the DW, the appellant was not under any medication that can affect his mind.[60]

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[58] Singh, A., (2005). "Admissibility of cranio-facial superimposition evidence as a means of forensic identification," Dissertation (M. CJ), Faculty of Law, University of Malaya, p. 50-55.
[59] *John Nyumbei v Public Prosecutor* [2007] 2 CLJ p. 513-514.
[60] *John Nyumbei v Public Prosecutor* [2007] 2 CLJ p. 516.

Overall process of examination DW2 found that the appellant suffered from "acute psychotic order". He also opined that the appellant's illness was not the "very serious type, in other words, mild to moderate in severity". He also further added that the appellant did not suffer from a total impairment of his cognitive functions relating to his memory, reasoning ad understanding faculties.[61]

Based on the expert testimony, court came to a conclusion that the appellant was sane at the time he committed the crime. The court also concluded that the appellant was capable of knowing the nature and seriousness of his act as being against the law. Therefore, taking the expert opinion as relevant evidence, the appeal by the appellant was dismissed and he was sentenced accordingly.[62]

**CASE 2**

The accused, Mohd. Ya'cob b. Dimyati was charged with the offence of murder under Section 302 Penal Code that carry death mandatory.[63] The accused was alleged to have murdered Along on the night of 25th December, 1999 at kilometer 28 Jalan Kuala Klawang Genting Peras. Information from one of the witness revealed that, the accused was the last person seen with the deceased. The accused was arrested for investigation. The accused committed the murder out of jealousy as he suspected his wife of having an affair with the deceased. Information given by the accused has lead to the discovery of the deceased's body stuffed in a gunny sack at kilometer 28 Jalan Kuala Klawang Genting Peras on 6th January, 2000.[64]

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[61] *Ibid.*
[62] *Ibid.*, p. 519, 521.
[63] *Mohd. Ya'cob b. Dimyati v Public Prosecutor*, in the Court of Appeal of Malaysia, Held in Federal Territory of Putrajaya, Criminal Appeal No. N-05-44-2002.
[64] *Ibid.*, p. 43-44.

The gunny sack was sent to Forensic Unit, Hospital University Kebangsaan Malaysia (HUKM), now recognized as University Kebangsaan Malaysia Medical Centre (UKMMC). Examination revealed that the body in the gunny sack was in a fetal position. The body was badly decomposed and partly skeletonized. The internal organs and reproductive organ were decomposed and was beyond recognition. Certain articles were found with the body and they were steel buttons, strips of blue denim cloth (jeans) on the neck (to strangle the deceased), on the arms and legs to tie them up, and also strip of denim cloth to tie the gunny sack.[65]

Examination by Forensic Pathologist opined that the cause of death of the deceased was "probable ligature strangulation." Further examination was conducted by examining the sex, age, skull, race, hair, jeans, tooth, and DNA. Skull and teeth superimposition were also conducted.

Sex of the deceased was determined from the skull. Gross examination of the forehead part of the skull showed that it was protruding and the deceased was a male. Skull examination also revealed that the deceased was of mixed racial, Chinese and India, but the weight was more to India with a ratio 60:40. It was concluded that, the deceased was Malay with a bit of Indian features. Examination on skull also showed that the deceased was from Mongoloid and Caucasoid origin, and these two features were belonged to Malay.[66]

Age was ascertained by analyzing the bone and teeth. Analysis showed that the age was around 18-22 years old,[67] while Dental Restorative specialist opined that deceased was late teenager and was around 17-22 years old based on the teeth structure.[68] Apart from that, DNA sample was collected from femur, muscle, hair and nail of the deceased, and blood from the deceased parents for DNA profiling. The DNA result showed that DNA of the

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[65] *Ibid.*, p. 45.
[66] *Ibid.*, p. 24.
[67] *Ibid.*
[68] *Ibid.*, p. 45.

deceased was match with the parents, and probability of the match was not less than 99%.[69] Based on the DNA profiling result, chemist confirmed that the deceased was that of the offspring of the parents.

Younger brother of the deceased gave evidence that the deceased has a Levis 501, size W28, length 31, and with 4 steel buttons, and these features were found similar to that of strips of denim used to tie the gunny sack.[70] Skull-photo superimposition and photo dental model superimposition was conducted at Studio B, Sri Pentas TV3. Skull-photo superimposition showed that the photograph of the deceased was perfectly matched with the skull. Teeth superimposition has as well showed a perfect match.[71]

From all the evidences adduced and testimony by the prosecution witness, the prosecutor conceded that the evidences against the accused were entirely circumstantial. The evidences were all conclusive to the identity of the deceased and the accused has admitted that he committed the crime. The evidences adduced against the accused were "beyond reasonable doubt." The appeal was dismissed and the Court held that the accused, Mohd. Ya'cob b. Dimyati was found guilty of murder and was sentenced to death by hanging.[72]

From the two cases presented (Case 1 and Case 2), skull-photo evidence was accepted and admissible in court. Skull-photo evidence as adduced in court was presented as corroborative evidence that strengthens and confirms the identity of the deceased. On the other hand, skull-photo evidence can increase and add up the percentage of identification (as has been stated by Mr. Amidon Anan). As has been mentioned in the murder case of Along, the chemist has concluded that probability of the match of the DNA result was not less than 99%. In this case, the confirmation of DNA analysis may be 99.9%,

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[69] *Ibid.*, p. 25, 26, 31.
[70] *Ibid.*, p. 45.
[71] *Ibid.*, p. 28.
[72] *PP v Mohd. Ya'cob b. Dimyati*, In the High Court of Seremban, Holden in Negeri Sembilan, Criminal Trial No. 45-4-2000, p. 57.

and another 0.1% can be filled up by the presence of skull-photo evidence which will make the identification percentage higher than before.

## 4.5 POSITION IN OTHER COUNTRY

In the real sense, skull-photo superimposition in Malaysia is not a fully establish technique for identification purpose. Different professions have opined their different view in regards to applicability and acceptance of the technique.

Owing to this implication, the acceptance of skull-photo superimposition in other countries and rules governing the evidence in the court is considered and looked into. Provision from India is studied to compare with the existing Malaysia provision. India has productively utilizing the technique of skull-photo superimposition as one of the identification means for human identification purpose. Lots of existing literatures has documented on the utility of the technique. In addition, the researcher has managed to collect several Indian court case which highlighting skull-photo superimposition technique.

Provision on expert evidence in India is covered in Section 45, Section 46, Section 47, and Section 51 of The Indian Evidence Act 1872 and Section 293 of Criminal Procedure Code 1973.[73] Further details will be elaborated in next section.



[73] Nabar, B.S., (2001). *"Forensic Science in Crime Investigation,"* Chapter 21: Law relating to experts and scientific evidence, p. 358-359, 3rd edition, Asia Law House Hyderabad.

### 4.5.1 INDIAN EVIDENCE ACT 1872

In India, Section 45 of the Act is very important in relation to scientific evidence, and it reads as follows:[74]

> When the court has to form an opinion upon a point of foreign law or of science or art, or as to identify or genuineness of handwriting or finger impressions, the opinions upon that point of persons specially skilled in that foreign law, science or art, or in questions as to identity of genuineness of handwriting or finger impressions, are relevant facts. Such persons are called experts.

This section also indicates the requisite requirement of an expert. "Expert" in this section is someone who is specially skilled. The skill is required through basic education, training, experience, research, participation in scientific gatherings, and publication of research, reviews, case histories, and books.[75]

Other section of the Act which relevant to forensics is Section 46 which provides provision on facts bearing upon opinions of experts, and reads as follows:[76]

> Facts, not otherwise relevant, are relevant if they are supported or are inconsistent with the opinions of expert, when such opinions are relevant.

With regards to relevancy of handwriting opinion, Section 47 of the Evidence Act 1872 lays down:[77]

> When the court has to form an opinion as to the person by whom any document was written or signed, the opinion of any person acquainted with the handwriting of the person by whom it is supposed to have been written or signed, that it was or was not written or signed by the person, is a relevant fact.

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[74] *Ibid.*, p. 358.
[75] Sharma, B.R., (2003). *"Forensic science in criminal investigation and trials,"* 4th edition, p. 58-59, Universal Law Publishing Co. Pvt. Ltd.
[76] See Note 64, p. 359.
[77] *Ibid.*, p. 359.

With regards to grounds of opinion, Section 51 of the Act states:[78]

> Whenever the opinion of any living person is relevant, the grounds on which his opinion is based are also relevant.

### 4.5.2 CRIMINAL PROCEDURE CODE OF INDIA 1973

The main section of this Code which relates to Government Scientific expert is Section 293. It reads as:[79]

1. Any document purporting to be a report under the hand of a Government scientific expert to whom this section applies, upon any matter or thing duly submitted to him for examination or analysis and report in the course of any proceedings under this Code, may be used as evidence in any inquiry, trial or other proceedings of the Code.

2. The court may, if it thinks fit, summon and examine any such expert as to the subject-matter of the report.

3. When any such expert summoned by the court and he is not able to attend personally, he may, unless the court has expressly directed him to appear personally, depute any responsible person working with him to attend the court, if such officer is conversant with the facts of the case and can satisfactorily depose in court in his behalf.

4. The section applies to the following Government scientific expert, namely:
   (a) any Chemical Examiner or Assistant Chemical Examiner to Government;
   (b) the Chief Inspector of Explosives;
   (c) the Director of Fingerprint Burea;
   (d) the Director, Haffkeine Institute, Bombay;
   (e) the Director, the Deputy Director or Assistant Director of Central Forensic Science Laboratory or State Forensic Science Laboratory;
   (f) the Serologist to the Government.
   (g) Gazetted officer of the Mint or of the India Security Press (including the office of the Controller of Stamps and Stationery) as the Central Government may, by notification, specify in this behalf.

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[78] *Ibid.*
[79] *Ibid.*, p. 360-361.

The High Court has inherent power to call for a second report from Chemical Examiner and this provision is stated in Section 482 of the same Code.[80]

> Nothing in this Code shall be deemed to limit or affect the inherent powers of High Court to make such orders as may be necessary to give effect to any order under this Code or to prevent abuse of the process of any court or otherwise to secure the ends of justice.

## 4.6 APPLICATION OF SKULL-PHOTO EVIDENCE IN INDIA

This section will present a few criminal cases in India on how the court come to the judgment based on the evidence of skull-photo adduced.

### CASE 1

Seven accused persons, namely, Shibu Soren, Sunil Khaware, Ashish Thakur, Nand Kishore Mehta @ Nandu, Shalendra Bhattacharya, Ajay Kumar Mehta @ Dilip and Pashupati Nath Mehta @ Posho have been chargesheeted by Crime Branch Investigation (CBI) for facing trial in a murder case in the High Court of Delhi, New Delhi for offence punishable under 364 (kidnapping), 302 (murder), and 120B (criminal conspiracy) of the Indian Penal Code (IPC). They were being accused for abduction and murder of Shashi Nath Jha. The missing of Shashi Nath Jha was reported by his brother, Amar Nath Jha at police post North Avenue.[81]

The brief fact of the case was, the accused was charged of abducting Shashi Nath Jha on 22.5.94 at about 11.00 p.m. near Dhaula Kuan and thereafter committing murder of

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[80] *Ibid.*, p. 362.
[81] *Shibu Soren v CBI,* In the High Court of Delhi, New Delhi, Code of Criminal Procedure, Criminal Appeal No.64 of 2007.

Shashi Nath Jha by striking heavy iron rod on his head by accused Nand Kishore Mehta @ Nandu inside his house in village Tikra Toli, Distt. Ranchi, at about midnight in the last week of May, 1994 and thereafter removing dead body of Shashi Nath Jha by accused Nand Kishore Mehta @ Nandu, Ajay Kumar Mehta @ Dilip, Pashupati Nath Mehta @ Posho, Shalendra Bhattacharya besides one lady and two other unknown persons and concealing the dead body of Shashi Nath Jha by burying it near brick klin of accused Nand Kishore Mehta @ Nandu and subsequently removing the dead body and burying it at jungle in Piska Bagan, Piska Nagri, Distt. Ranchi.[82]

Almost 4 years after Shashi Nath Jha was missing and allegedly murdered, skeletonized remains were exhumed on 13.8.98 by the Crime Branch Investigation (CBI) team in the presence of independent witnesses and Executive Magistrate.[83]

Postmortem of the skeletal remains was conducted by Dr. Ajit Kumar Chaudhary (PW17). Post Mortem Report Ex. PW 17/A reported that, age, sex and injury over the skull and time of death found matched with the deceased Shashi Nath Jha. The recovered skull and other discovered articles were sent to Andhra Pradesh Forensic Science Laboratory, Hyderabad. Superimposition was carried out by Dr. T.S.N. Murthy (Director of Forensic Science Laboratory, Hyderabad), enlarging the photograph of Shashi Nath Jha and superimposed with the skull. It was opined that the said skull could be belong to Shashi Nath Jha, the individual in the photograph.[84]

Besides remains of human skeleton, some articles i.e. one orange colour cloth piece, one Metal Kara, one jean's pant "Brand sticker", etc., were also recovered. The deceased Shashi Nath Jha on the day of incident was stated to be wearing a Kara and jean's pant by witness. It indicates that the recovered articles could be connected with deceased Shashi

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[82] *Ibid.*
[83] *Ibid.*
[84] *Ibid.*

Nath Jha. Dr. G.R. Bhaskar, Professor of Forensic Medicine, Hyderabad examined the recovered skull and gave the opinion regarding causation of injury as:[85]

> (a) Fracture on the left frontal region of the skull.
> (b) The fracture is ante-mortem in nature.
> (c) There is no evidence of any repair or healing of the fracture and indicates that the person must have received the fracture at the time of his death.

He also indicated that the possibility of a heavy metal rod causing the injury cannot be ruled out. During the trial, the family of Shashi Nath Jha refused to accept that the skeleton was of Shashi Nath Jha for reasons stated by Vijay Nath Jha, brother of Shashi Nath Jha, who has deposed as:[86]

> We were suspicious about the identity of the aforesaid skeleton and skull because of description given by CBI to the effect that a Kara was recovered with the skeleton and there was a silver tooth in the aforesaid skull. Since Shashi Nath Jha had no silver teeth, we suspected that the skeleton and skill did not belong to him and as such we did not apply to authorities for taking the aforesaid skull and skeleton for performing the last rites of Shashi Nath Jha.

To same effect is the statement of Amar Nath Jha, who has stated as:[87]

> We were suspicious about the identity of said skeleton because we were told that skull had silver teeth a Kara was also with the skeleton. After the recovery of skeleton I had stated before the press that I suspect that my brother Shashi Nath Jha is still alive. I said so because the description of articles recovered along with the skeleton and the silver teeth did not tally with the description of Shashi Nath Jha or his clothes.

Priyambda Devi, mother of Shashi Nath Jha, has stated as:[88]

> My son, Shashi Nath Jha was wearing kurta and payjama, when I last saw. He was not wearing any "Kara" in his right or left hand. I was asked by the Police whether my son used to wear "Kara" or had a silver teeth and I had told the police that he never wore any "Kara" nor had any silver tooth, though his teeth were stained on account of consumption of paan. After 3 or 4 days of the recovery of the skeleton, I was informed that the skeleton had kara and one silver tooth. My son Shashi Nath Jha did not wear jeans or broad belt on it. The police had not shown me any articles for identification. The police did not tell me that the skeleton was that of my son Shashi Nath Jha or that we should perform last rites. I do not remember whether in the Writ Petition filed on my behalf, my lawyer had mentioned therein that when the CBI informed

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[85] *Ibid.*
[86] *Ibid.*
[87] *Ibid.*
[88] *Ibid.*

> me about the articles found on the skeleton, such as remnants of jeans and the belt and further told me that there was "kara" lying in the place wherefrom skeleton was exhumed and further that there was a silver tooth in the denture of the skeleton. I told the police that the skeleton was not that of my son.

Witness in the examination-in-chief, Praveen Kumar Oraon during his visit to village Piska Nagri said that hundreds of villagers from Piska village stating that the skeleton exhumed by the CBI was that of a local person, Aleem. Habibullah, Aleem's brother contended that human skeleton may be of his deceased brother because he was also wearing the same "Kara" recovered from the grave. V.K. Pandey, the Investigating Officer, stated as:[89]

> There was no claim made to me or any person by the name of Habibullah of the skeleton which had been received. I had met parents of Aleem later on, after the filing of the charge sheet. I do not recollect if I had met parents of Aleem after the DNA. Report had been received. Articles i.e. "Kara, pairs of shoes, clothes and the buckle of belt" which were recovered along with the skeleton had not been shown to the parents of Aleem. All these exhibits had been sealed and they could not be opened till they were opened in the court."

On medical examination conducted on the skull of the exhumed skeleton by PW-17, Dr. Ajit Kumar Chaudhary, his opinion was as:[90]

> I have opined that the inquiry on skull could have been caused by heavy sharp edge weapon. It could be a "farsa, sword, axe". The injury could not have been caused with a steel rod (saria)".

The opinion given by Dr. Ajit Kumar Chaudhary is contradicted with the claim made by CBI that the injuries on the skull were made by an iron rod. Referring to the scientific view of Dr. K.S. Narayan Reddy in his book "The Essential of Forensic & Toxicology, 17th Edition" is;

> This test of a more negative value because it can definitely be stated that the skull and the photograph are not those of the same person. If they tally, it can only be stated that the skull could be that of the person in the photograph, because of the possibility another skull of this size and contour may tally with the photograph".

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[89] *Ibid.*
[90] *Ibid.*

The view of Dr. K.S. Narayan Reddy on superimposition test is agreed by Dr. T.S.N. Murthi and Dr. K.P.C. Gandhi who cooperated in conducting the superimposition test. In this particular case, prosecution party had failed to prove the conspiracy between the accused the victim. Apart from that, prosecution has failed to establish the skeleton exhumed to be that of Shashi Nath Jha. The appellants (the 7 accused persons) were all finally acquitted from all the charges.[91]

**CASE 2**

The accused, Swamy Shraddananda was convicted and sentenced to death under Sections 302 and 201 of the Indian Penal Code, for committing murder of his wife on or about 28.05.1991 at their residential house at 81, Richmond Road, Bangalore. The deceased, Shakerah blessed with four daughters from her earlier marriage with her ex-husband, Akbar Khaleeli.[92]

The fact of the case was, the deceased, Shakerah was reported missing from 28.05.1991. Sabah Khaleeli, one of deceased's daughters had been trying to contact her on phone. She was informed by the appellant that the deceased had gone to Hyderabad. In June 1991, when contacted, she was informed that her mother had gone to Kutch to attend a wedding. A week thereafter she was informed that the deceased had been lying low owing to some income tax problems. She, being exasperated with the said explanations, came down to Bangalore. She did not find her mother there. She was told that the deceased being pregnant had gone to United States of America for delivery of the child. She was told to have been admitted in Roosevelt Hospital. She made verifications thereabout through her acquaintances and came to know that no such woman had ever been admitted to the said hospital. Appellant being confronted thereto informed her that the

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[91] *Ibid.*
[92] *Swamy Shraddananda @ Murali Manohar Mishra v State of Karnataka* [2007] RD-SC 649.

deceased had gone to London as she had wanted to keep it as a secret. However, in 1992, when she met the accused at Mumbai, noticed the passport of her mother lying in the room of the hotel which confirmed that the deceased had not visited USA or London as represented to her by the appellant on earlier occasions.[93]

The daughter lodged a police report and investigation commenced by the Central Crime Branch. The suspect, Swamy Shraddananda was apprehended thereafter. The suspect was interrogated and finally he made a voluntary statement. The suspect discloses the details on how he had killed his wife and locates to the police the place he buried his wife.[94]

Wooden box containing skeletal remains, bed, a nighty, pillow and bed sheets were discovered. The skeletal remains were assembled and identified to be that of human skeleton. Further identification of the human skeletal remains was established. The mother of the deceased, Smt. Gauhar Taj Namazie identified a ring which was embedded with red stone and two other black rings as belonging to the deceased. The nighty which was recovered was identified to be belonging to the deceased by the maid servant who had been working in the house.[95]

Skull and mandible were submitted to laboratory for superimposition analysis. Organs and hair were preserved for chemical analysis, while bone marrow, hair, and soft tissues were preserved for DNA profiling. Blood sample from the deceased's parents, Mirza Gulam Hussain Namazie and Gauhar Taj Begum Namazie were also taken for comparison purpose. The DNA test confirmed that the deceased was the offspring of the parents.[96]

Photo Superimposition Method Test was performed by superimposing the skull with the photograph of the deceased. According to the expert, anthropometric characters or land

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[93] *Ibid.*
[94] *Ibid.*
[95] *Ibid.*
[96] *Ibid.*

marks of the skull and the superimposed admitted photographs matched. Her qualification as an expert to conduct the said test is not in doubt. Even otherwise, she holds a Ph.D. degree in Forensic Science. She has been awarded a medal for her research work by the Madras Forensic Society of India. She has also undergone special training in photo superimposition and has submitted a number of papers thereon. Report on superimposition test produced by her is relevant evidences.[97]

The allegation of the deceased murder was fully established by several witnesses. According to the deceased's daughter, Sabah Khaleeli, she in her deposition categorically stated that she had spoken to her mother on 19.04.1991. The deceased was not available on phone from May, 1991 onwards. She in her deposition stated that she had last seen the deceased on 13.04.1991. The maid servant and the gardener-cum-handyman, who has been working with the deceased since 1988 also alleged that they saw the deceased in the company of the appellant in the morning of 28.05.1991, for the last time. The said two witnesses in their depositions corroborated each other.[98]

The various circumstances leading to the pointing out the guilt of the appellant and appellant alone have been enumerated by us hereinbefore. From the interrogation of all the witnesses, it is evident that each of the circumstances had been established, the cumulative effect whereof would show that all the links in the chain are complete and the conclusion of the guilt is fully established. The appeal was dismissed, and the High Court affirmed the judgment of conviction and sentence.[99]

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[97] *Ibid.*
[98] *Ibid.*
[99] *Ibid.*

## 4.7 DISCUSSION

There are various tools of identification technique to make an identification of dead bodies. There are fingerprint analysis, deoxyribonucleic acid (DNA) analysis, dental analysis, visual recognition, and no less importantly, the so called skull-photo superimposition. Not one single methods of identification can survive alone as sometimes positive or ultimate identification will only be made possible by a combination of several techniques. Identification of burnt human remains for instance cannot be solely rely on DNA analysis as DNA from bone may have been destroyed. Otherwise, the importance of tooth for identification can be demonstrated. In addition, skull-photo superimposition can be performed and superimposed with the suspected missing or dead person. These combinations of several techniques made it possible to make a complete identification of a deceased.

In a murder case of a deceased, Along,[100] the partly skeletonized remains were examined by analyzing the sex and age from bone and teeth, race from the skull, DNA profiling, and skull and teeth superimposition. All the evidences were cogently prove the identity of the skeleton as belong to the deceased, Along. All the evidences were admissible in court under Section 9 of the Evidence Act 1950 which reads as:[101]

> Facts necessary to explain or introduce a fact in issue or relevant fact, or which support or rebut in inference suggested by a fact in issue or relevant fact, or which establish the identity of any thing or person whose identity is relevant, or fix the time or place at which any fact in issue or relevant fact happened or which show the relation of parties by whom any such fact was transacted, are relevant so far as they are necessary for that purpose.

The question in issue of this particular case is the identity of the skeletal remains. The identity can be established by examining the bone and make comparison with the suspected person which would suggest that as belonging to the deceased. Examination of

[100] The detail of this case was provided on page 84-86.
[101] Section 9 of the Evidence Act 1950.

the bone such as prominence of forehead, age and sex would be features that might establish "identity of anything or person" within the meaning of Section 9 of the Evidence Act 1950. Other than the aforementioned evidences, other evidence presented in this case was a photograph of the suspected dead person, Along. The photograph of the deceased was admissible in evidence to make identification by skull-photo superimposition. The superimposition analysis demonstrated by expert has opined that photograph of the deceased was perfectly matched with the skull, and teeth superimposition has as well showed a perfect match. Thus, it appears that such evidence clearly be within Section 9 of the Evidence Act 1950.

### 4.7.1 OVERVIEW OF THE CRIMINAL JUSTICE SYSTEM IN MALAYSIA

Criminal justice system comprises of several outstanding professionals (e.g. police, public prosecutors, judge) and has their own particular duty. It starts from investigation process which vested in police. The duty to decide whether a person ought to be charged with the available evidences lies with the Public Prosecutor. While, a lawyer bears the duty to defend an accused person and finally the court will adjudicates.[102]

There are two important aspects in criminal justice system which goes hand in hand until the verdict is announced by the Court. There are investigation of crime and prosecution of the criminal case in Court.[103] The investigation of crime is vested in police which is the most outstanding agency in any investigation. While the latter lies solely in Public Prosecutor.

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[102] Azmi, A., "Effective administration of the police and the prosecution in criminal justice in Malaysia," 120th International Senior Seminar Participants' Papers, Resource Material Series, No. 60, p. 149. February 2002, United States.
[103] *Ibid.*

The police have the inherent power to investigate and are clearly lays out in the Criminal Procedure Code (CPC). The duty of the police is *inter alia* to arrest offenders and gather evidences. While, in the aspect of prosecution, the power is in the hand of public prosecutor. The power of public prosecutor to prosecute has spelled out in the Federal Constitution, Article 145 (3) and reads as:[104]

- The prosecutor may institute and conduct any proceedings for a criminal offence.
- May discontinue criminal proceedings that are instituted.
- May amend a charge at any point of time during the conduct of a prosecution, if there is proper basis.
- Courts cannot compel the Attorney General to institute prosecution which he does not intend to institute or to proceed with any criminal proceedings which are to be discontinued.
- Courts cannot compel the Attorney General to enhance a charge when he is content to proceed on a lesser charge.

In addition to the provision mentioned above, there is supplementary provision in Criminal Procedure Code (CPC) which provides Public Prosecutor a control and direction of all criminal prosecutions. It is stated in the Section 376 (1) of the Criminal Procedure Code (CPC).[105]

Police and Public Prosecutor will always work in close collaboration during the investigation and subsequent proceeding. Police governed by the Police Act 1967 has the power to investigate the commission of crime and to apprehend the suspect responsible for the crime committed. Chapter IV of Criminal Procedure Code has spelt out in details regarding the procedure of investigations.[106] To enable a charge to be framed against the accused, police will conduct his investigation (include gathering relevant evidences) assigned to him. After completing the investigation, the investigation paper will be submitted to Attorney-General's Chambers. The Public Prosecutor will scrutinize the paper and if sufficient evidences to prosecute the suspect for a particular offence committed are

[104] Clause 3, Article 145 of Federal Constitution.
[105] Section 376 (1) of the Criminal Procedure Code: The Attorney General shall be the Public Prosecutor and shall have the control and direction of all criminal prosecutions and proceedings under this Code.
[106] Section 15 to Section 33, Chapter IV of the Criminal Procedure Code.

available, the public prosecutor will direct the prosecution case. A charged can then be developed against the accused.[107]

To prosecute the accused person for an offence, the appreciation of evidence is the utmost important. In any criminal trial, the strength of evidence will be taken into consideration for a success of prosecution. The strength of the prosecution evidence will determine of whether the evidence is credible and reliable enough to convict an accused. Admissibility and reliability of prosecution evidence adduced in Court will be considered for arriving at the fair and just decision of the case.

Normally in any trial, testimony from eyewitness is very helpful. Eyewitness who is willing to come forward to assist in the trial may expedite the prosecution to convict the accused. On the other hand, expert's opinion as corroborative evidence gives strength to the eyewitness statement to reach to a satisfactory conclusion and thereby justice will be attained. In the murder case of Along for example, there are lots of witness came forward and prosecution evidences adduced by the Prosecution against the accused were entirely circumstantial. The prosecution evidences (scientific evidences such as DNA result, dental superimposition, skull-photo superimposition) were directly relates to the victim corroborated by expert evidences (e.g. chemist, dental expert, superimposition expert). The evidences adduced were strong enough to convict the accused.

From the above scenario and in any criminal proceeding, Public Prosecutor will entirely rely on the evidence gathered by the police to obtain a conviction against an accused person. In an entirely different scenario, if skull-photo evidence presented as corroborative evidence (e.g. unavailable DNA evidence), some consideration may be taken into account. Since skull-photo evidence corroborates other evidences towards personal identification of a victim, it is the role of prosecutor to consider of whether the evidence is

[107] See Note 102, p. 152.

credible evidence relevant to the alleged crime. In addition, besides skull-photo evidence, prosecutor may see all the available legal evidence to be presented in court.

The verdict the Court made will lies in the strength of the prosecution evidences. Skull-photo evidence, presented in corroborative evidence should convince the Court beyond reasonable doubt in the pursuit of justice, and especially for the interest of public.

### 4.7.2 COURT JUDGMENT ON SKULL-PHOTO SUPERIMPOSITION TECHNIQUE

As has been stressed in earlier sub paragraph, the court will not flatly accept the opinion given by the expert witness. The presented evidence will be subjected to careful scrutiny by the court and final judgment will be made thereafter. In the case of Pancham Sukla[108] for example, the Judge has stated that:[109]

> Considerable pains appear to have been taken to establish the identity by the superimposition – a process which is apparently new in this country.

The Supreme Court has challenged the admissibility of the superimposition technique as an evidence under the Indian Evidence Act. The judges observed:[110]

> We are however, clearly of the opinion that it is admissible in evidence under section 9 of the Indian Evidence Act.....Any deficiency in scientific accuracy might go to the weight of the evidence which in the case in hand was a matter for the jury to consider, but we are now only on a very narrow question as to whether it is excluded from evidence as inadmissible. Our answer is that it was admissible in evidence.

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[108] Pancham Sukla, a sub-gunner was reported missing on 10th March, 1960. The accused, Romlochan admitted guilty and led the police to the place he murdered Pancham. Human skeleton wrapped in dhoti and clothes was found and was partly submerged in water. Articles such as red colored flag with white border which usually used by gunners, brass buttons on the torn clothes, sacred thread, black leather shoe, and 12" long spring knife were discovered, and found to be belong to the victim, Pancham. Sex and age of the victim was examined from the bone and results indicated that it was tallied with the description of the deceased. Skull-photo superimposition was attempted by a team of experts to make further identification and the result was satisfactory. See A., (1964). "Camera identifies human skull," *The Indian Police Journal*, Vol. XI, No.2, p. 42-46.

[109] Banarjee, A., (1964). "Camera identifies human skull," *The Indian Police Journal*, Vol. XI, No.2, p. 46.

[110] *Ibid.*

The researcher was unable to obtain officially the court judgment of the skull-photo evidence in Malaysia. Nevertheless, the evidence of skull-photo superimposition was admissible in court,[111] and the technique of skull-photo superimposition has been conducted by an expert to establish identity of an unknown skull in a several murder cases, and has successfully identify the victim with satisfactory result.[112] From the cases provided, it was clearly showed that skull-photo superimposition can assist in dissemination of justice. The judicial acceptance of this technique by the court can motivate and compel its future use as corroborative and adjunct technique alongside other popular scientific techniques, and importantly utilized as one of the identification tools for identifying unknown human skull.

[111] Interview with Mr. Awang Armadajaya Awang Mahmud, a Public Prosecutor, on 24th December 2009, at Attorney General Chamber, Appeal Unit, Putrajaya.
[112] Example of the cases were Along's case and John Nyumbek's case.

# CHAPTER 5

# SUGGESTION AND RECOMMENDATION

## 5.1 INTRODUCTION

An extensive and comprehensive account of skull-photo superimposition for individual identification has been presented in earlier chapters. In this chapter, the researcher will highlight and emphasize the utility of skull-photo superimposition technique in Malaysia. The researcher will also offer some suggestions and recommendations with the objective to popularize the implementation and utility of skull-photo superimposition technique in Malaysia.

Firstly, the utility of skull-photo superimposition technique for individual identification has been well established in many parts of a country, especially India. The admissibility of the technique as an evidence was recognized and accepted in the court of law. Skull-photo superimposition is a technique whereby an unknown skull is superimposed or laid on the photograph of a suspected dead person in an attempt to make identification by appreciating and analyzing the match between the two. Skull-photo superimposition is a supplementary technique to establish identification of human dead bodies. In addition, it is used in combination with other scientific techniques such as deoxyribonucleic acid (DNA), fingerprint, and dental analysis to strengthen and increase the accuracy and confirmation of human identification process.

## 5.2 THE STATE OF THE ART OF SKULL-PHOTO SUPERIMPOSITION IN MALAYSIA

From the research findings, skull-photo superimposition technique was not much progressing in Malaysia and was not as popular as other scientific technique. The

technique has not been employed in institutions which play a critical role in forensic investigation, for example Royal Malaysian Police (RMP), Chemistry Department of Malaysia, and government hospitals. Till the present day, the only institution that employs skull-photo superimposition was University Kebangsaan Malaysia Medical Centre (UKMMC), and the technique used was video superimposition. University Kebangsaan Malaysia Medical Centre (UKMMC) has employed skull-photo superimposition in one reported murder case and the victim who was badly burnt has positively identified by superimposition technique corroborated with other articles found (e.g. earring which was found similar wore by the victim as shown in the photograph). Formerly, foreign expert from Japan was called to conduct skull-photo superimposition in the attempt to make identification of a victim in a several celebrated murder cases in Malaysia (e.g. John Nyumbek's case and Mona Fandey's case), and has positively identify the victims.

In legal aspect, the evidence of skull-photo superimposition is admissible in the Malaysian court. Till the present day, as far as the researcher concerned, there were two cases brought forth skull-photo evidence in the court to confirm the identity of the victim (e.g. Along's case and John Nyumbei's case) with the presence of other confirmatory evidences (e.g. DNA evidence and dental evidence).

The almost universal answer to the reliability of skull-photo superimposition technique was "unreliable". The researcher is of the view that, this issue deepens when no attempts was taken seriously to carefully consider and adopt this technique. Taking this posture might be a mistake in the realm of science as the technique can assist in forensic investigation. In retrospect, the first leg of superimposition was ventured by Prof. Brash to make an identification of a murdered victim. This first attempt has compelled other scientist to leap into this technique and has as well produced a satisfactory result. Years of work by many scientists has contributed to the improvement and betterment of the technique for the purpose of increasing its reliability. Taking the advancement and success of implementation

of skull-photo superimposition technique in other country as an example, skull-photo superimposition is highly recommended in our country on several grounds.

### 5.2.1 Add up the percentage (%) of identification.

The utilization of skull-photo superimposition can be taken as corroborative technique and the evidence can be taken as corroborative evidence to complement other scientific evidence such as DNA, fingerprint, and dental evidence. Therefore, skull-photo evidence can increase the percentage of identification.[1] On occasion, the quality and quantity of other evidences such as DNA, fingerprint and dental may be questionable, limited and insufficient to confirm human identity, thus preclude complete human identification.[2] Recognizant about this, skull-photo superimposition is important to be made into realization to furnish inherent flaw that may exist in other identification techniques.

In the murder case of Along for example,[3] DNA test showed that DNA of the deceased, Along was match with the parents, and probability of the match was not less than 99%. In this case, the confirmation of DNA analysis may be 99.9%, and another 0.1% can be filled up by the presence of skull-photo evidence which will make the identification percentage higher than before.

In the massive disaster such as the collapse of Highland Towers Condominium, most of the bodies were badly decomposed and some were reduced to skeleton. Identification of the victims was performed by dental analysis. However, problems encountered when attempts to make identification by teeth. The major problems were unavailable dental records of the majority of Malaysian people, lost of dental record due to massive fatalities,

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[1] Interview with Mr. Amidon Anan, former Head of Crime Scene Management and are now a Consultant of Noble Forensic Investigation (NFI) and Service, on 15th December, 2009.
[2] *Ibid.*
[3] The detail of this case was provided in Chapter 4, at page 84-86.

and some Malaysian had their dental treatment overseas. Less than half of the victims were positively identified, while the remaining had incomplete identity.[4]

Victims with incomplete identity as illustrated in the aforementioned scenario were an obvious example of the limitation and insufficiency of dental evidence to establish complete identity of a victim. Thus, the researcher is of the view that skull-photo superimposition if being employed in this particular case will help to establish complete identity of the victims, and increase the percentage of human identification.

### 5.2.2 Unidentified human skeletal remains

In addition, the need of skull-photo superimposition utilization is obvious by the fact that there are unidentified human remains discovered especially skeletonized human remains. Based from the finding of this research, the unidentified human skeleton will either buried or cremated. The researcher of the opinion that, it is worthwhile to pursue this superimposition approach, as it could be possible to establish the identity of the unknown skull.

### 5.2.3 The quality and quantity of other confirmatory evidences

On occasion, routine forensic or medical investigation (e.g. DNA analysis, fingerprint analysis, and dental analysis) failed to establish a complete identification of dead bodies. This was especially true in badly decomposed, burnt human remains and skeletonized human remains. Performing analysis on confirmatory evidences such as fingerprint and DNA was impossible. Dental analysis on the other hand might also be another hindrance

[4] Alhabshi, S.F., and Nambiar, P., (1995). "The Contribution of Forensic Odontology in the Highland Towers Condominium Disaster," *Annals Dent. Univ. Malaya*, Vol. 2, p. 27.

especially when no available data or record for comparison. Thus, the need for an inclusion of skull-photo superimposition for supporting and corroborating identification should be reinforced especially in this particular case and importantly in the near future.

## 5.3 SUGGESSTIONS AND RECOMMENDATIONS

In view of the aforementioned situations, the researcher would like to emphasize and strongly recommend the use of skull-photo superimposition for human identification, as a corroborative technique to strengthen and confirm other evidences to achieve best results. Importantly, awareness on the importance and usefulness of skull-photo superimposition among the police, pathologist and other related professionals is important to enable the technique of skull-photo superimposition to be put into realization. Therefore, suggestions and recommendations are to be put forward and are as follows:

### 5.3.1 Consider skull-photo superimposition as one of the human identification technique

As to other popular scientific technique (e.g. DNA analysis, fingerprint analysis, dental analysis), skull-photo superimposition is no less importantly, one of scientific technique to establish identity of an unknown skull. Most of the documented literatures have highlighted the usefulness of the technique when other avenues of identification are not possible or reliable (e.g. limited DNA sample, badly burnt body, skeletonized human remains, and unavailable dental record).

Skull-photo superimposition must be prepared and utilized for any possibility that the utility will be requested and required for human identification and investigation in the future (for example in a massive disaster such as Highland Towers Condominium disaster). The

researcher can foresee the potential of this technique as one of the identification tools. Thus, skull-photo superimposition technique should not be disregarded as it can serve as an adjunct to other available technique. Skull-photo superimposition can be used as human identification technique when other scientific technique is impossible. It is therefore highly recommended that the concerned institution adopt the technique and utilizing it as one of the identification technique.

It is imperative that criminal investigations not to confine themselves to only DNA, fingerprint, and dental analysis as a means of identification and solution of a crime. Identification of skeletal remains is now more reliable than ever before as many techniques of superimposition have been developed by outstanding scientist.

### 5.3.2 Education, research, and training

A sufficient teaching in University offering a Forensic Science program should be more emphasized. Education institutions particularly play a vital role in disseminating the knowledge and information about skull-photo superimposition. Skull-photo superimposition, as it seems new in Malaysia can be inspired among the students by broadening the scope of teaching actively.

On the one hand, more research on skull-photo superimposition should be conducted to discover new knowledge. As has been featured in this research paper, there are many contributions that many scientists have made in regards to skull-photo superimposition. It gives the insight on how to understand and learn more about human face, particularly when it can be associated with the suspected skull. Fully cognizant about this, the researcher is of the view that more work need to be done as it demands a skillful process. Importantly, to improve the existing flaw that may exist in present investigation system.

- Support the prevention and suppression of special crimes.
- Manage the crime scene evidence.
- Establish integrated network at both domestic and international levels.
- Set the central standard of evidence examination that meets the international standard.
- Propose the amendment and development of laws and regulations relating to forensic practices.
- Conduct crime scene investigation in Nonthaburi province and postmortem in four provinces; Nonthaburi, Pathum Thani, Phra Nakhon Si Ayutthaya and Nakhon Nayok as requested by inquiry officers.
- Serve, in cooperation with the Department of Special Investigation, as the central agency where complaints from injured person can be filed.
- Publicize the role of forensic science in justice process and promote public cooperation and understanding in forensic practices.
- Establish the Missing Person Identification Centre and the National DNA Centre in order to integrate and develop the databases of anti-crime agencies.

According to Dr. Pornthip Rojanasunan, all aspects of criminal investigation in Thailand were previously controlled entirely by police. Thus, the institute attempted to improve and transform police work by making use of science in the investigations.[7] Thailand can be an exemplary country for their efforts that have been put up to create the forensic institute.

Malaysia is recommended to adopt this endeavor by Thailand to improve the investigation process in Malaysia by incorporating science and experts in the investigation. The functions of Central Institute of Forensic Science (CIFS) can be taken as guidelines in

[7] *ABC News,* December 03, 2007.

an attempt to improve and increase the competency of Malaysian criminal justice system in the solution of crime as well as effective administration of justice.

## 5.4 CONCLUSION

Failure to make complete identification of dead bodies implies a failure of investigation, and thus affects effective administration of justice. As has been stressed earlier, it is imperative that criminal investigations not to confine themselves to only DNA, fingerprint, and dental analysis as a means of identification and solution of a crime. Incorporation and inclusion of skull-photo superimposition technique as one of the human identification tools is needful to support and strengthen identification for the sake of justice and to minimize legal and humanitarian difficulties. Therefore, solution of crime and administration of justice can be improved.

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## APPENDIX 1

### Appendix 1 (a)

Information/data required from hospital for the research that will be conducted.

1. Number of dead bodies received as 'unidentified' for the past 10 years on a year by year basis.

2. Number of dead bodies that are fresh i.e., in a state wherein personal identity can be established by photographing the faces and by showing them to the relatives, other witnesses or by publicizing them.

3. Number of dead bodies that are received in a state wherein visual or photographic means of identification would be impossible viz.
   a. bloated,
   b. decomposed (black putrefied),
   c. partially skeletonized and
   d. skeletonized
   e. as fragmented bony remains

4. Number of unidentified dead bodies assessed as belonging to persons of Islam and the means by which the religion was assessed.

5. Number of unidentified bodies assessed as belonging to religions other than Islam.

6. Storing period of the unidentified dead bodies in the mortuary. (Islam/other religions)

7. Method of disposal of the unidentified dead bodies after the storing period (Burial, cremation etc?): (Islam /other religions)

8. If buried, are the burial places 'marked'?

9. What routine attempts are taken to scientifically establish the identity of the unidentified dead bodies (Photographing the face, Skull-photo superimposition, DNA etc)?

10. Success rate in attempts to identify dead bodies.

11. Whether skull-photo superimposition has ever been attempted as a method for identifying the unidentified dead bodies? If yes - in how many cases and where? If no - why it was not attempted?

**Appendix 1 (b)**

Information/data required from Chemistry Department of Malaysia for the research that will be conducted.

1. Number of cases requiring DNA-based identification using bones (femur, skull etc), and details about the cases for the past 10 years on a year by year basis.
2. Number of cases in which DNA could be successfully extracted.
3. The date of receipt of the case and the date of identification.
4. Number of cases in which biological identity has been established.
5. Among the identified cases, whose DNA ante mortem sample has been obtained and used – mother, father, brother, sister etc.
6. Number of cases that continue to remain unidentified – and the reasons for it. (reasons may include lack of availability of ante mortem DNA or relatives, etc.)
7. Number of cases that remain unidentified along with the date their receipt.
8. Is there any attempt to establish skull-photo superimposition unit in JKM.
9. Whether JKM had any role so far in any skull-photo superimposition carried out in Malaysia so far by experts from other countries.

**Appendix 1 (c)**

Information/data required from Polis DiRaja Malaysia (PDRM) for the research that will be conducted.

1. Number of individuals who are reported missing for the past ten years on a year by year basis.
   Adults: males/females
   Children: males/females

2. Number of individuals who were traced among the missing for the past ten years on a year by year basis.
   Adults: males/females
   Children: males/females

3. Number of the missing individuals that have been traced alive.

4. Number of the missing individuals continuing to remain missing along with the date from which they are missing.

5. Whether photographs of the missing individuals are maintained as database.
   If so, how long are they maintained, and how many such photographs are available now.

6. Number of unidentified dead bodies that are reported from different police stations.

7. Whether face photographs of unidentified dead bodies are maintained as database? If so how many have been identified by witnesses.

8. Whether face photographs of unidentified dead bodies are compared with the face photographs of missing individuals.

9. What routine attempts are taken to scientifically establish the identity of the unidentified dead bodies (Photographing the face, Skull-photo superimposition, DNA etc).

10. Success rate in attempts to identify dead bodies.

11. Whether skull-photo superimposition has ever been attempted as a method for identifying the unidentified dead bodies? If yes – the details of cases and the expert involved? If no – any reason?

## Appendix 2 (a)

Total number of unidentified dead bodies in year 1999.

| Month | No. | Age | Sex | Race | Religion | Cause of Death | Action |
|---|---|---|---|---|---|---|---|
| Jan | 1 | 20's | Male | India | Hindu | Drug-related death | Cremation |
| | 2 | 65 | Female | Chinese | Buddha | Head injury | Cremation |
| | 3 | 30's | - | - | - | Head injury | Buried by JAWI |
| | 4 | 25 | Male | Malay | Islam | Drug-related death | Buried by JAWI |
| | 5 | 40's | Male | Chinese | Buddha | Pulmonary oedema | Cremation |
| | 6 | 50's | Female | India | Hindu | Multiple injury due to road accident | Cremation |
| | 7 | 35 | Male | Malay | Islam | Drug-related death | Buried by JAWI |
| | 8 | 40's | Male | India | Hindu | Drug-related death | Cremation |
| | 9 | 20's | Male | - | - | Decomposed body (probably drowning) | Buried by JAWI |
| | 10 | 30's | Male | Malay | Islam | Drug-related death | Buried by JAWI |
| Feb | 11 | 30's | Male | Malay | Islam | Drug-related death | Buried by JAWI |
| | 12 | 40's | Male | Malay | Islam | Drug-related death | Buried by JAWI |
| | 13 | Adult | Male | Malay | Islam | Severe head injury due to blunt trauma | Buried by JAWI |
| | 14 | - | Male | - | - | Drug-related death | Buried by JAWI |
| | 15 | Adult | Male | - | - | Drug-related death | Buried by JAWI |
| | 16 | 30's | Male | Malay | Islam | Head injury | Buried by JAWI |
| | 17 | 40's | Male | Indonesian | - | - | Buried by JAWI |
| March | 18 | Adult | Male | India | Hindu | - | Cremation |
| | 19 | Adult | Male | India | Hindu | - | Cremation |
| | 20 | Adult | Male | Others | - | Drowning | Buried by JAWI |
| | 21 | 30's | Male | India | Hindu | Undetermined | Cremation |
| | 22 | 40's | Male | India | Hindu | Drug-related death | Cremation |
| | 23 | Adult | Male | Malay | Islam | Drug-related death | Buried by JAWI |
| Apr | 24 | 31 | Male | Chinese | Buddha | Drug-related death | Cremation |
| | 25 | Adult | Male | Malay | Islam | Drug-related death | Buried by JAWI |
| Mei | 26 | 45 | Male | Chinese | Buddha | Lung abcess pneumonia | Cremation |
| | 27 | Adult | Male | Malay | Islam | Head and intraabdominal injury due to road accident | Buried by JAWI |
| | 28 | 40's | Male | Chinese | Buddha | Drug-related death | Cremation |
| | 29 | Adult | Male | Chinese | Buddha | Haemoperitoneum with liver rupture due to blunt force trauma | Cremation |
| | 30 | Adult | Female | - | - | Undetermined | Buried by JAWI |
| | 31 | Adult | Male | - | - | Lung abcess | Cremation |
| | 32 | - | Male | Chinese | Buddha | Septicemia | Cremation |
| | 33 | Adult | Male | Malay | Islam | Cervical cord transection with atlanto-occipital dislocation due to road accident | Buried by JAWI |
| | 34 | 40's | Male | Malay | Islam | Retroviral disease | Buried by JAWI |
| | 35 | Adult | Male | Chinese | Buddha | Head injury from road accident | Cremation |
| | 36 | Adult | Male | Malay | Islam | Drug-related death | Buried by JAWI |
| | 37 | Adult | - | - | - | Liver disease | Cremation |
| | 38 | Adult | Male | Chinese | Buddha | Drug-related death | Cremation |
| | 39 | - | Male | India | Hindu | Decomposed body (Unascertained) | Cremation |
| | 40 | 40's | Male | Chinese | Buddha | Drug-related death | Cremation |
| June | 41 | Adult | Male | - | - | Multiple slash wounds at the neck | Buried by JAWI |
| | 42 | 40's | Male | Chinese | Buddha | Drug-related death | Cremation |
| | 43 | 50's | Male | India | Hindu | Drug-related death | Cremation |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 44 | 30's | Male | Malay | Islam | Retroviral disease | Buried by JAWI |
| | 45 | Adult | Male | India | Hindu | Drug-related death | Cremation |
| | 46 | - | Male | India | Hindu | Strangulation with slashed wounds | Cremation |
| | 47 | 50's | Male | Malay | Islam | Drug-related death | Buried by JAWI |
| July | 48 | - | Male | India | Hindu | Intracranial bleed | Buried by JAWI |
| August | 49 | 55 | Female | India | Hindu | Drowning | Cremation |
| | 50 | 36 | Male | Chinese | Buddha | Multiple injuries consistent with a fall from height | Cremation |
| | 51 | 40's | Male | India | Hindu | Upper gastrointestinal bleed | UKM Anatomy Department |
| | 52 | 40's | Male | Malay | Islam | Drug-related death | Buried by JAWI |
| Sept | 53 | Adult | Male | India | Hindu | Retroviral disease | Cremation |
| | 54 | Adult | Male | India | Hindu | Undetermined | Cremation |
| | 55 | - | - | - | - | Unknown skull - unascertained | Cremation |
| | 56 | Adult | Male | India | Hindu | Multiple injuries due to road accident | Cremation |
| | 57 | Adult | Male | Malay | Islam | Drug-related death | Buried by JAWI |
| | 58 | 30's | Male | Malay | Islam | Drug-related death | Buried by JAWI |
| | 59 | 30's | Male | India | Hindu | Drug-related death | Cremation |
| Okt | 60 | 55 | Female | India | Hindu | Drowning | Cremation |
| | 61 | Adult | Male | Malay | Islam | Drug-related death | Buried by JAWI |
| Nov | 62 | Adult | Male | India | Hindu | Intracranial injury | Cremation |
| | 63 | Adult | Male | Indonesian | - | Cut throat injury | Buried by JAWI |
| Dec | 64 | Adult | Male | Chinese | Buddha | Multiple injuries due to a fall from height | Cremation |
| | 65 | Adult | Male | - | - | Incised wound at the neck | Buried by JAWI |
| | 66 | Adult | Male | - | - | Neck injury due to sharp weapon | Buried by JAWI |

Total number of dead bodies in year 1999 = **66**

## Appendix 2 (b)

Total number of unidentified dead bodies in year 2000.

| Month | No. | Age | Sex | Race | Religion | Cause of Death | Action |
|---|---|---|---|---|---|---|---|
| Jan | 1 | Adult | Male | India | Hindu | Liver disease | Sent to Universiti Islam Antarabangsa (UIA) |
| | 2 | Adult | Male | India | Hindu | Head injury due to blunt trauma | Cremation |
| | 3 | 35 | Male | Malay | Islam | Drug-related death | Buried by JAWI |
| | 4 | 60's | Male | India | Hindu | Liver disease | Sent to Universiti Islam Antarabangsa (UIA) |
| | 5 | 30's | Male | Chinese | Buddha | Drug-related death | Cremation |
| | 6 | Adult | - | - | - | Cachexia and septicemia | Cremation |
| | 7 | 35 | Male | Malay | Islam | Drowning | Buried by JAWI |
| Feb | 8 | 20's | Male | Chinese | Buddha | Injury due to road accident | Cremation |
| March | 9 | Adult | Female | - | - | Skeletonized remains | Cremation |
| | 10 | 30's | Female | Malay | Islam | Drug-related death | Buried by JAWI |
| | 11 | 30's | Male | India | Hindu | Drug-related death | Cremation |
| Apr | 12 | 30's | Male | - | - | Drowning | Cremation |
| | 13 | - | Female | - | - | Injury due to road accident | Buried by JAWI |
| May | 14 | - | Female | Chinese | Buddha | Head injury due to road accident | Sent to Universiti Islam Antarabangsa (UIA) |
| June | 15 | Adult | Male | - | - | Electric shock | Cremation |
| | 16 | 45 | Male | Chinese | Buddha | Drug-related death | Cremation |
| | 17 | Adult | Female | India | Hindu | Drug-related death | Cremation |
| July | 18 | 30's | Male | Malay | Islam | - | |
| August | 19 | 40's | Male | Malay | Islam | Drug-related death | Buried by JAWI |
| | 20 | 25 | Male | Malay | Islam | Bronchial asthma | Buried by JAWI |
| | 21 | 30's | Male | Malay | Islam | Drug-related death | Buried by JAWI |
| | 22 | 30's | Male | Malay | Islam | Drug-related death | |
| | 23 | Adult | Male | Malay | Islam | Drug-related death | |
| Sept | 24 | 47 | Male | India | Hindu | Drug-related death | Cremation |
| | 25 | 20's | Male | Malay | Islam | Chest injury due to road accident | Buried by JAWI |
| | 26 | 35 | Male | Malay | Islam | Severe head injury | Buried by JAWI |
| | 27 | 45 | Male | Malay | Islam | Severe head injury | Buried by JAWI |
| Okt | 28 | 70's | Male | Chinese | Buddha | Chest injury due to road accident | Cremation |
| | 29 | Adult | Male | India | Hindu | Crushed injury due to road accident | Cremation |
| | 30 | 60's | Female | Malay | Islam | Left renal carcinoma with pyelonephritis | Buried by JAWI |
| | 31 | 40's | Male | Malay | Islam | Drug-related death | Buried by JAWI |
| Nov | 32 | 40's | Male | Chinese | Buddha | Severe head injury | Sent to Hospital Universiti Kebangsaan Malaysia (HUKM) |
| | 33 | 55 | Male | Malay | Islam | Septicemia | Buried by JAWI |
| | 34 | ± 35 | - | - | - | Undetermined | Buried by JAWI |
| | 35 | Adult | Male | India | Hindu | Septicemia | Sent to Anatomy Department, Universiti Kebangsaan Malaysia (UKM) |
| Dec | 36 | 27 | Male | | | Stab on the chest | Buried by JAWI |
| | 37 | 50's | Male | India | Hindu | Pneumonia | Cremation |
| | 38 | 40's | Male | India | Hindu | Drug-related death | Cremation |
| | 39 | 30's | Male | India | Hindu | Cerebral auscen | Cremation |

Total number of dead bodies in year 2000 = **39**

## Appendix 2 (c)

Total number of unidentified dead bodies in year 2001.

| Month | No. | Age | Sex | Race | Religion | Cause of Death | Action |
|---|---|---|---|---|---|---|---|
| Jan | 1 | 30's | Male | Malay | Islam | Pending investigation | Buried by JAWI |
| | 2 | - | - | - | - | Decomposed body (Unascertained) | Buried by JAWI |
| | 3 | 40's | Male | Chinese | Buddha | Septicema | Cremation |
| | 4 | 30's | Male | Malay | Islam | Drug-related death | Buried by JAWI |
| | 5 | 30-40's | Male | India | Hindu | Drug-related death | Cremation |
| | 6 | - | Male | India | Hindu | Undetermined | Cremation |
| Feb | 7 | 33 | Male | Indonesian | | Severe head injury | Buried by JAWI |
| | 8 | 60's | Male | Chinese | Buddha | Septicemia | Sent to Hospital Universiti Kebangsaan Malaysia (HUKM) |
| | 9 | 40's | Male | Chinese | Buddha | Drug-related death | Cremation |
| | 10 | 40's | Male | India | Hindu | Head and chest injury | Cremation |
| March | 11 | 30's | Male | Chinese | Buddha | Drug-related death | Cremation |
| | 12 | 30-40's | Female | - | - | Septicemia | Sent to Hospital Universiti Kebangsaan Malaysia (HUKM) |
| | 13 | Adult | Male | India | Hindu | Head injury due to blunt trauma | Cremation |
| Apr | 14 | 40's | Male | India | Hindu | Retroviral disease | Cremation |
| | 15 | 32 | Male | India | Hindu | Retroviral disease | Sent to Anatomy Department, Universiti IslamAntarabangsa (UIA) |
| | 16 | 20's | Male | Chinese | Buddha | Post-traumatic with hydrocephalus septicemia | Cremation |
| | 17 | 40's | Male | Chinese | Buddha | Retroviral disease | Sent to Hospital Universiti Kebangsaan Malaysia (HUKM) |
| May | - | - | - | - | - | - | - |
| June | 18 | 35 | Male | India | Hindu | Drug-related death | Sent to Hospital Universiti Kebangsaan Malaysia (HUKM) |
| | 19 | 40's | Male | Chinese | Buddha | Retroviral disease | Cremation |
| | 20 | | Male | Chinese | Buddha | Retroviral disease | Cremation |
| | 21 | 50's | Male | Chinese | Buddha | Retroviral disease with head injury | Cremation |
| | 22 | 40's | Male | Chinese | Buddha | Drug-related death | Cremation |
| July | 23 | 50's | Male | India | Hindu | Liver cirrhosis | Cremation |
| | 24 | 30's | Male | Malay | Islam | Retroviral disease | Buried by JAWI |
| | 25 | 35 | Male | Malay | Islam | Drug-related death | Buried by JAWI |
| August | 26 | 30's | Male | Chinese | Buddha | Drug-related death | Buried by JAWI |
| | 27 | - | - | - | - | Craniofacial injury due to blows from sharp and blunt weapon | Buried by JAWI |
| | 28 | 30's | Male | Chinese | Buddha | Drug-related death | Cremation |
| | 29 | 40's | Male | India | Hindu | Retroviral disease | Cremation |
| Sept | 30 | 40's | Male | Chinese | Buddha | Drug-related death | Cremation |
| | 31 | 30's | Male | Malay | Islam | Ligature strangulation | Buried by JAWI |
| | 32 | 40's | Male | Indonesian | - | Multiple slash and stabbed wound | Buried by JAWI |
| | 33 | 40's | Male | Chinese | Buddha | Bronchopneumonia | Cremation |
| | 34 | 35 | Male | Chinese | Buddha | Severe head and chect injury | Sent to Dental Department, Universiti Kebangsaan Malaysia (UKM) |
| Okt | 35 | - | - | - | - | Unknown skull (Undetermined - probably head injury) | Cremation |
| | 36 | - | Male | Indonesian | - | - | Buried by JAWI |
| Nov | 37 | 30's | Male | Chinese | Buddha | Drug-related death | Cremation |
| | 38 | - | Female | Indonesian | Islam | Massive blood loss due to multiple stab wound | Buried by JAWI |
| | 39 | Adult | Male | India | Hindu | Pneumonia | Cremation |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 40 | 30's | Male | Chinese | Buddha | Drug-related death | Cremation |
| | 41 | 40's | Male | India | Hindu | Drug-related death | Cremation |
| Dec | 42 | Adult | Male | India | Hindu | Facial injury | Cremation |
| | 43 | Adult | Male | Chinese | Buddha | Drug-related death | Cremation |
| | 44 | 50's | Male | India | Hindu | Drug-related death | Cremation |
| | 45 | 40's | Male | India | Hindu | Drug-related death | Cremation |

Total number of dead bodies in year 2001 = **45**

## Appendix 2 (d)

Total number of unidentified dead bodies in year 2002.

| Month | No. | Age | Sex | Race | Religion | Cause of Death | Action |
|---|---|---|---|---|---|---|---|
| Jan | 1 | 30's | Male | Chinese | Buddha | Drug-related death | Cremation |
| | 2 | Adult | Male | India | Hindu | Drug-related death | Cremation |
| | 3 | 40's | Male | - | - | Undetermined due to advanced decomposition | Cremation |
| | 4 | 30's | Male | India | Hindu | Drug-related death | Cremation |
| | 5 | 30's | Male | Malay | Islam | Drug-related death | Cremation |
| | 6 | 53 | Male | India | Hindu | Decomposed body (Unascertained) | Cremation |
| | 7 | 38 | Male | Chinese | Buddha | Drug-related death | Cremation |
| Feb | 8 | - | Male | Chinese | Buddha | Drug-related death | Cremation |
| | 9 | - | Male | Chinese | Buddha | Decomposed body (Unascertained) | Cremation |
| | 10 | 30's | Male | India | Hindu | Septicemia | Cremation |
| March | 11 | 20's | Male | Malay | Islam | Drug-related death | Buried by JAWI |
| | 12 | 25-30 | Male | Indonesian | - | Massive blood loss due to stab on the buttock | Buried by JAWI |
| Apr | 13 | 30's | Male | India | Hindu | Drug-related death | Cremation |
| | 14 | 30's | Female | India | Hindu | Drug-related death | Cremation |
| | 15 | - | - | - | - | Stab on the neck | Cremation |
| | 16 | 20-30's | Male | Bangladesh | - | Right frontal contusion with diffuse axonal injury complicated by renal failure and sepsis | Cremation |
| | 17 | - | Male | India | Hindu | Drug-related death | Cremation |
| May | 18 | - | - | - | - | Unknown skull | Buried by JAWI |
| | 19 | 30's | Male | Chinese | Buddha | Drug-related death | Cremation |
| June | 20 | 40's | Male | India | Hindu | Drowning | Cremation |
| | 21 | 30's | Male | Malay | Islam | Drug-related death | Buried by JAWI |
| | 22 | 30's | Male | Malay | Islam | Head injury due to blunt trauma | Buried by JAWI |
| July | 23 | 30's | Male | India | Hindu | Drug-related death | Cremation |
| August | 24 | 40's | Male | India | Hindu | Drug-related death | |
| | 25 | 50's | Male | India | Hindu | Coronary thrombosis | Cremation |
| Sept | 26 | 40's | Male | - | - | Drowning | Cremation |
| | 27 | 40's | Male | India | Hindu | Drug-related death | Cremation |
| Okt | 28 | - | Male | - | - | Head injury with incised wound to the neck | Cremation |
| Nov | 29 | 60's | Male | India | Hindu | Intraabdominal hemorrhage due to ruptured spleen | Cremation |
| Dec | 30 | 30's | Male | India | Hindu | Drowning | Cremation |
| | 31 | 40's | Male | Malay | Islam | Drug-related death | Buried by JAWI |
| | 32 | - | Male | Malay | Islam | Head injury due to blunt trauma | Buried by JAWI |

Total number of dead bodies in year 2002 = **32**

## Appendix 2 (e)

Total number of unidentified dead bodies in year 2003.

| Month | No. | Age | Sex | Race | Religion | Cause of Death | Action |
|---|---|---|---|---|---|---|---|
| Jan | 1 | 50's | Female | India | Hindu | Multiple injuries due to road accident | Cremation |
| | 2 | 30's | Male | India | Hindu | Drug-related death | Cremation |
| Feb | - | - | - | - | - | - | - |
| March | 3 | 40's | Male | - | - | Multiple blunt trauma | Cremation |
| Apr | 4 | 40's | Male | India | Hindu | Decomposed body (Unascertained) | Cremation |
| | 5 | - | Male | - | - | Skeletonized remains (fatal head injury due to slashed wound | Cremation |
| | 6 | 28 | Male | - | - | Head injury due to road accident | Cremation |
| May | - | - | - | - | - | - | - |
| June | 7 | 60's | Female | Chinese | Buddha | Pulmonary tuberculosis | Cremation |
| | 8 | 70's | Male | Malay | Islam | Head and abdomen injury due to road accident | Buried by JAWI |
| | 9 | 40's | Male | - | - | Hanging | - |

Total number of dead bodies in year 2003 = **9**

**Appendix 2 (f)**

Total number of unidentified dead bodies in year 2004.

| Month | No. | Age | Sex | Race | Religion | Cause of Death | Action |
|---|---|---|---|---|---|---|---|
| Jan | 1 | - | | - | - | Severe head injury | Cremation |
| | 2 | - | Female | - | - | Aborted fetus | Cremation |
| Feb | - | - | - | - | - | - | - |
| March | 3 | 50's | Male | Chinese | Buddha | Oppurtunistic infection | Cremation |
| Apr | 4 | | Male | Malay | Islam | Multiple incised wound | Buried by JAWI |
| | 5 | 30's | Male | India | Hindu | Pulmonary tuberculosis | Cremation |
| May | 6 | | Male | India | Hindu | Oppurtunistic infection | Cremation |
| June | 7 | | Male | Indonesian | | Skeletonized remains | Buried by JAWI |
| July | 8 | Adult | Male | Male | Malay | Severe head injury due to road accident | Buried by JAWI |
| August | 9 | Adult | Male | - | - | Multiple stab wound | Buried by JAWI |
| Sept | 10 | - | - | - | - | - | Buried by JAWI |
| | 11 | 30's | Male | Chinese | Buddha | Drug-related death | Cremation |
| Okt | 12 | - | Male | - | - | Burned body (Strangulation) | Buried by JAWI |
| | 13 | - | Female | India | Hindu | Head injury due to road accident | Cremation |
| | 14 | - | Male | - | - | Amputation of neck (incised wound) | Buried by JAWI |
| | 15 | 60's | Male | India | Hindu | Oppurtunistic infection | Cremation |
| | 16 | 60's | Male | Chinese | Buddha | Septicemia | Cremation |
| | 17 | 40's | Male | India | Hindu | Decomposed body (undetermined) | Cremation |
| Nov | 18 | 31 | Male | India | Hindu | Septicemia with miliary tuberculosis | Cremation |
| | 19 | 30's | Male | Male | Malay | Decomposed body (Unascertained) | Buried by JAWI |
| | 20 | 50's | Male | Indonesian | - | Oppurtunistic infection | Buried by JAWI |
| | 21 | 30's | Male | Chinese | Buddha | Severe head injury | Cremation |
| | 22 | 39 | Male | India | Hindu | Head injury due to blunt trauma | Cremation |
| | 23 | 40's | Male | Indonesian | - | Incised wound to the right elbow | Buried by JAWI |
| Dec | 24 | 40's | Male | Chinese | Buddha | Oppurtunistic infection | Cremation |

Total number of dead bodies in year 2004 = **24**

## Appendix 2 (g)

Total number of unidentified dead bodies in year 2005.

| Month | No. | Age | Sex | Race | Religion | Cause of Death | Action |
|---|---|---|---|---|---|---|---|
| Jan | - | - | - | - | - | - | - |
| Feb | 1 | - | Male | - | - | Ligature and strangulation | Buried by JAWI |
| | 2 | 20's | - | - | - | Head injury due to blunt force | Buried by JAWI |
| March | 3 | - | Male | India | Hindu | Retroviral disease | Cremation |
| Apr | 4 | 20's | Male | Male | Malay | Multiple injury | Buried by JAWI |
| | 5 | 30's | Male | India | Hindu | Oppurtunistic infection | Cremation |
| | 6 | 30's | Male | - | - | Chest injury | Cremation |
| May | 7 | 50's | Male | Chinese | Buddha | Pneumonia | Cremation |
| | 8 | 60's | Male | India | Hindu | Head injury due to road accident | Cremation |
| June | 9 | - | - | - | - | Undetermined | Buried by JAWI |
| | 10 | 20's | - | - | - | Multiple injury | Cremation |
| July | 11 | 30's | Male | India | Hindu | Pneumonia | Cremation |
| | 12 | 30's | Male | India | Hindu | Pulmonary Tuberculosis | Cremation |
| August | - | - | - | - | - | - | - |
| Sept | 13 | 40's | Male | India | Hindu | Ischemic heart disease | Cremation |
| | 14 | 30's | Male | - | - | Decomposed body (Unascertained) | Buried by JAWI |
| | 15 | 65 | Male | India | Hindu | Sepsis with traumatic head injury | Cremation |
| | 16 | Adult | - | - | - | Decomposed body (Chest and facial injury due to blunt trauma) | Buried by JAWI |
| Oct | 17 | 50's | Male | Chinese | Buddha | - | Cremation |
| Nov | 18 | 30's | Male | - | - | Incised wound on the neck | Cremation |
| | 19 | - | - | - | - | Unknown skull | Buried by JAWI |
| | 20 | - | Male | - | - | Skeletonized remains (Multiple slash injuries) | Buried by JAWI |
| Dec | 21 | - | - | - | - | Skeletonized remains | Cremation |

Total number of dead bodies in year 2005= **21**

## Appendix 2 (h)

Total number of unidentified dead bodies in year 2006.

| Month | No. | Age | Sex | Race | Religion | Cause of Death | Action |
|---|---|---|---|---|---|---|---|
| Jan | 1 | 30's | Female | Indonesian | - | Head injury due to blunt force trauma | Buried by JAWI |
| Feb | 2 | 30's | Male | - | - | Decomposed body (Unascertained) | Buried by JAWI |
| | 3 | 30's | Male | India | Hindu | Traumatic head injury | Cremation |
| | 4 | 35 | Male | - | - | Chest infection | Buried by JAWI |
| March | 5 | - | - | - | - | Abortion | Buried by JAWI |
| | 6 | 30's | Male | - | - | Hanging | Buried by JAWI |
| Apr | - | - | - | - | - | - | - |
| May | 7 | 20's | Male | - | - | Decomposed body (Unascertained) | Buried by JAWI |
| | 8 | 65 | Male | India | Hindu | Upper gastrointestinal bleeding | Cremation |
| June | 9 | - | Male | Indonesian | - | Head injury due to blunt force trauma | Buried by JAWI |
| July | 10 | 57 | Male | Male | Malay | cardiogenic shock | Buried by JAWI |
| August | 11 | 30's | Male | India | Hindu | Head and chest injury | Cremation |
| Sept | 12 | 30's | Male | - | - | Undetermined | Buried by JAWI |
| Okt | 13 | 30's | Female | - | - | Incised wound on the neck | Buried by JAWI |
| | 14 | 50's | Male | India | Hindu | Sepsis with peritoneus | Cremation |
| Nov | 15 | 50's | Male | India | Hindu | Acute intestinal obstruction | Cremation |
| | 16 | 50's | Male | India | Hindu | Chest infection | Cremation |
| | 17 | 29 | Male | India | Hindu | Pending investigation (Septicemia) | Cremation |
| | 18 | 40's | Male | India | Hindu | Coronary anomaly | Cremation |
| Dec | - | - | - | - | - | - | - |

Total number of dead bodies in year 2006= **18**

## Appendix 2 (i)

Total number of unidentified dead bodies in year 2007.

| Month | No. | Age | Sex | Race | Religion | Cause of Death | Action |
|---|---|---|---|---|---|---|---|
| Jan | - | - | - | - | - | - | - |
| Feb | 1 | - | Male | - | - | Slashed wound to the face and neck with stabbed wound to the abdomen | Buried by JAWI |
| March | 2 | 50's | Male | India | - | Fulminant tuberculosis pneumonia | Cremation |
| Apr | 3 | 30's | Male | Malay | - | Pneumonia | Buried by JAWI |
| | 4 | 30's | Female | - | - | Asphyxia due to suffocation | Buried by JAWI |
| | 5 | 50's | Male | Chinese | Buddha | Pending investigation | Cremation |
| May | 6 | 41 | Male | Malay | Islam | Chest infection | Buried by JAWI |
| June | 7 | 46 | Male | India | Hindu | Pulmonary Tuberculosis | Sent to Anatomy Departme Universiti Putra Malaysia (UPM) |
| | 8 | - | Male | - | - | Decomposed body (Unascertained) | Buried by JAWI |
| July | 9 | 40's | Male | India | Hindu | Oppurtunistic infection | Cremation |
| | 10 | 50's | Male | Chinese | Buddha | Head injury | Cremation |
| | 11 | 18 | Female | India | Hindu | Asphyxia | Cremation |
| August | - | - | - | - | - | - | - |
| Sept | - | - | - | - | - | - | - |
| Okt | 12 | 50's | Male | Malay | Islam | Pulmonary Tuberculosis | Buried by JAWI |
| | 13 | - | Male | Chinese | - | Oppurtunistic infection | Cremation |
| Nov | 14 | 54 | Male | India | - | Oppurtunistic infection | Cremation |
| Dec | - | - | - | - | - | - | - |

Total number of dead bodies in year 2007= **14**

## Appendix 2 (j)

Total number of unidentified dead bodies in year 2008.

| Month | No. | Age | Sex | Race | Religion | Cause of Death | Action |
|---|---|---|---|---|---|---|---|
| Jan | - | - | - | - | - | - | - |
| Feb | 1 | - | Male | India | Hindu | Oppurtunistic infection | Cremation |
| | 2 | - | Female | - | - | Head injury due to road accident | Buried by JAWI |
| | 3 | - | Male | Chinese | Buddha | Chest infection | Cremation |
| | 4 | - | Male | - | - | Probable suffocation | Buried by JAWI |
| March | 5 | Adult | Male | India | Hindu | Septic shock secondary severe pneumonia | Cremation |
| | 6 | 70's | Female | Chinese | Buddha | Multiple injuries due to road accident | Cremation |
| Apr | - | - | - | - | - | - | - |
| May | 7 | - | - | - | - | Aborfus | Buried by JAWI |
| | 8 | - | Male | Malay | - | Compatible with chronic obstructive pulmonary disease | Buried by JAWI |
| | 9 | - | - | - | - | - | Buried by JAWI |
| | 10 | - | Female | | - | Manual strangulation | Buried by JAWI |
| June | 11 | - | - | India | - | Stab wound to the chest and abdomen | Cremation |
| July | 12 | 30's | Male | - | - | Miliary tuberculosis with underlying severe immunocompromised and HIV + | Buried by JAWI |
| | 13 | 60's | Male | Chinese | Buddha | Chest infection | Cremation |
| August | 14 | 38 | Female | - | - | Ligature strangulation | Buried by JAWI |
| | 15 | 30's | Male | India | Hindu | Consistent with hanging | Cremation |
| Sept | 16 | 27 | Male | Malay | Islam | Multiple stab wound to the body | Cremation |
| | 17 | 65 | Male | India | Hindu | - | Refered to Balai Jinjang |
| Okt | 18 | - | Male | - | - | Stab wound to the abdomen | Buried by JAWI |
| Nov | - | - | - | - | - | - | - |
| Dec | 19 | - | Male | - | - | Stab wound to the heart | Cremation |
| | 20 | 27 | Male | - | - | Immersion related death | Buried by JAWI |
| | 21 | 30's | Male | - | - | Immersion related death | Buried by JAWI |

Total number of dead bodies in year 2008= **21**

# Appendix 3

## Appendix 3 (a)

Total number of unidentified dead bodies in year 2003.

| Month | No. | Age | Sex | Race | Religion | Cause of Death | Autopsy No. | Action |
|---|---|---|---|---|---|---|---|---|
| Jan | 1 | - | Male | | | Strangulation | A11/03 | Undertaker |
| | 2 | 27 | Male | | | Facial injury heavy blunt trauma | A12/03 | Undertaker |
| Feb | 3 | 33 | Male | - | - | Multiple slash wound | A67/03 | JAWI |
| March | 4 | 22 | Male | Vietnamese | Buddha | Undetermined | A136/03 | Undertaker |
| April | - | - | - | - | - | - | - | - |
| May | 5 | 24 | Male | India | Hindu | Multiple injury | A245/03 | Undertaker |
| June | 6 | | Female | - | - | Drowning | A311/03 | JAWI |
| | 7 | 35 | Male | - | - | Pnemonia | A330/03 | Undertaker |
| July | 8 | 26 | Male | Vietnamese | - | Pending | A345/03 | Undertaker |
| | 9 | | Female | - | - | Drowning | A402/03 | JAWI |
| August | 10 | 34 | Male | Myanmar | - | Glass cut and hemorrhage | A391/03 | Undertaker |
| | 11 | 20 | Male | | - | Multiple injury | A392/03 | Undertaker |
| | 12 | 50 | Male | Chinese | - | Hanging | A436/03 | Undertaker |
| | 13 | 50 | Female | Chinese | - | Hanging | A437/03 | Undertaker |
| Sept | 14 | | Male | Malay | Islam | - | - | JAWI |
| | 15 | 39 | Male | Nepal | - | Undetermined | A473/03 | Undertaker |
| | 15 | 21 | Male | Vietnamese | Buddha | Undetermined | A483/03 | Undertaker |
| | 17 | 69 | Male | Chinese | Buddha | Severe coronary atherosclerosis | A503/03 | Undertaker |
| | 18 | 30 | Male | Malay | Islam | Pulmonary tuberculosis | A516/03 | JAWI |
| Okt | 19 | - | Male | Nepal | | Chest and abdomen injury | A529/03 | Undertaker |
| | 20 | - | Male | Chinese | | Cardiomyopathy | A536/03 | Undertaker |
| | 21 | - | Male | Vietnamese | Buddha | Undetermined | A545/03 | Undertaker |
| | 22 | - | Male | India | Hindu | Hanging | A580/03 | Undertaker |
| | 23 | - | - | - | - | - | A587/03 | JAWI |
| Nov | 24 | 40 | Female | India | Hindu | Chest injury | A609/03 | Undertaker |
| Dec | 25 | 33 | Male | Vietnamese | Buddha | Undetermined | A672/03 | Undertaker |
| | 26 | 33 | Male | Bangladesh | Islam | Undetermined | A708/03 | Undertaker |

Total number of dead bodies in year 2003 = **26**

## Appendix 3 (b)

Total number of unidentified dead bodies in year 2004.

| Month | No. | Age | Sex | Race | Religion | Cause of Death | Autopsy No. | Action |
|---|---|---|---|---|---|---|---|---|
| Jan | 1 | Adult | Male | Chinese | - | Drowning | A2/04 | Undertaker |
| | 2 | - | Female | - | - | Drowning | A11/04 | Undertaker |
| Feb | 3 | 30 | Male | - | - | Drowning | A104/04 | JAWI |
| March | 4 | 42 | Female | Indonesian | Islam | Stab injury to abdomen and chest | A103/04 | Undertaker |
| | 5 | 54 | Male | Indonesian | - | Undetermined | A218/04 | Undertaker |
| | 6 | 43 | Male | Chinese | - | Undetermined | A138/04 | Undertaker |
| April | 7 | 36 | Male | Bangladesh | Islam | Undetermined | A162/04 | Undertaker |
| | 8 | 18 | Male | - | - | Head injury | A172/04 | Undertaker |
| | 9 | 40 | Male | India | Hindu | Heart disease | A188/04 | Undertaker |
| | 10 | 24 | Female | Indonesian | Islam | Ligature strangulation | A205/04 | JAWI |
| May | 11 | 30 | Male | Indonesian | Islam | Motor-vehicle accident | A229/04 | JAWI |
| | 12 | 29 | Male | Bangladesh | Islam | Hanging | A247/04 | Undertaker |
| June | 13 | 31 | Male | - | - | Pulmonary hemorrhage | A288/04 | Undertaker |
| July | - | - | - | - | - | - | - | - |
| August | 14 | 40 | Female | - | - | Hanging | A397/04 | Undertaker |
| Sept | - | - | - | - | - | - | - | - |
| Okt | - | - | - | - | - | - | - | - |
| Nov | 15 | 26 | Female | Indonesian | | Multiple injury | A498/04 | Undertaker |
| | 16 | 23 | Male | Indonesian | Islam | Motor-vehicle accident | A536/04 | JAWI |
| Dec | 17 | 25 | Male | Vietnamese | | Myocardial infarct | A579/04 | Undertaker |

Total number of dead bodies in year 2004 = **17**

## Appendix 3 (c)

Total number of unidentified dead bodies in year 2005.

| Month | No. | Age | Sex | Race | Religion | Cause of Death | Autopsy No. | Action |
|---|---|---|---|---|---|---|---|---|
| Jan | 1 | 32 | Female | Indonesian | - | Hanging | A39/05 | Undertaker |
| | 2 | 35 | Male | - | - | Drowning (decomposed) | A49/05 | Undertaker |
| | 3 | 30 | Male | Nepal | Hindu | Drowning | A51/05 | Undertaker |
| Feb | - | - | - | - | - | - | - | - |
| March | - | - | - | - | - | - | - | - |
| April | 4 | 32 | Female | Indonesian | Islam | Multiple injury consistent with fall | A173/05 | Undertaker |
| | 5 | 20 | Male | India | Hindu | Multiple injury consistent with fall | A196/05 | Undertaker |
| May | 6 | 24 | Male | - | - | Pnemonia | A225/05 | Undertaker |
| | 7 | 27 | Female | - | - | Stab injury to chest | A254/05 | Undertaker |
| | 8 | - | Male | - | - | Drowning | A267/05 | Undertaker |
| | 9 | 27 | Male | - | - | Pnemonia | A264/05 | Undertaker |
| June | 10 | Adult | Male | - | - | Head injury | A325/05 | JAWI |
| July | 11 | 39 | Male | Myanmar | - | Tuberculosis | A331/05 | Undertaker |
| | 12 | 28 | Male | Nepal | Hindu | Pneumonia with sepsis | A334/05 | Undertaker |
| | 13 | - | Male | Indonesian | - | Deep slash wound at the neck | A364/05 | |
| August | 14 | 51 | Female | Philiphines | - | Acute myocardial insufficiency | A400/05 | Undertaker |
| | 15 | 35 | Female | Indonesian | Islam | Pnemonia tuberculosis | A403/05 | JAWI |
| | 16 | 25 | Male | - | - | Skeletonized remains | A467/05 | JAWI |
| | 17 | 30 | Female | Indonesian | Islam | Hanging | A427/05 | Undertaker |
| Sept | 18 | 24 | Male | Indonesian | Islam | Undetermined | A486/05 | Undertaker |
| | 19 | 27 | Male | Indonesian | Islam | Hanging | A495/05 | Undertaker |
| Okt | 20 | - | Male | India | - | Motor-vehicle accident | A509/05 | Undertaker |
| | 21 | 37 | Male | Thailand | - | Brain tumor | A514/05 | Undertaker |
| | 22 | - | - | - | - | Motor-vehicle accident | A503/05 | JAWI |
| | 23 | 21 | Male | Myanmar | - | Pnemonia | A532/05 | Undertaker |
| Nov | 24 | 44 | Male | Thailand | Buddha | Paraquat poisoning | A58/05 | Undertaker |
| | 25 | 27 | Male | - | - | Multiple stab injury | A617/05 | Undertaker |
| Dec | 26 | 41 | Male | Nepal | Hindu | Undetermined (maybe due to cardiac arythemia) | A637/05 | Undertaker |

Total number of dead bodies in year 2005 = **26**

## Appendix 3 (d)

Total number of unidentified dead bodies in year 2006.

| Month | No. | Age | Sex | Race | Religion | Cause of Death | Autopsy No. | Action |
|---|---|---|---|---|---|---|---|---|
| Jan | 1 | - | Male | - | - | - | - | Undertaker |
| | 2 | 46 | Male | Indonesian | Islam | Liver failure | A59/06 | Undertaker |
| Feb | - | - | - | - | - | - | - | - |
| March | 3 | 43 | Male | Indonesian | - | Miliary tuberculosis | A126/06 | Undertaker |
| | 4 | 47 | Female | Myanmar | - | Cranio cerebral damage by blunt force | A146/06 | Undertaker |
| April | 5 | 26 | Male | Vietnamese | Buddha | Stab injury to heart | A190/06 | Undertaker |
| | 6 | Adult | Male | Chinese | Buddha | Hypertension | A197/06 | Undertaker |
| May | 7 | 36 | Male | Myanmar | - | Railway accident | A264/06 | Undertaker |
| June | 8 | 26 | Female | Indonesian | Islam | Motor-vehicle accident | A273/06 | Undertaker |
| | 9 | - | - | - | - | Motor-vehicle accident | A277/06 | JAWI |
| | 10 | 26 | Male | - | Islam | Multiple injury consistent with fall | A295/06 | JAWI |
| | 11 | 30 | Female | Indonesian | | Tuberculosis | A307/06 | Undertaker |
| July | 12 | - | Male | Nepal | Hindu | Electrocution | A331/06 | Undertaker |
| | 13 | 37 | Male | Nepal | Hindu | Coronary thrombosis | A332/06 | Undertaker |
| | 14 | Adult | Male | - | - | Drowning | A361/06 | Undertaker |
| August | 15 | 36 | Male | India | Hindu | Coronary artery disease | A425/06 | Undertaker |
| Sept | 16 | 40 | Male | India | Hindu | Hanging | A437/06 | Undertaker |
| | 17 | 30 | Male | - | - | Drowning | A473/06 | Undertaker |
| | 18 | 67 | Male | Chinese | Buddha | Ischemic heart disease | A471/06 | Undertaker |
| | 19 | 50 | Male | Indonesian | Islam | Starvation | A474/06 | JAWI |
| | 20 | 26 | Female | Indonesian | Islam | Drowning | A478/06 | JAWI |
| Okt | 21 | 58 | Male | India | Hindu | Coronary artery disease | A524/06 | Undertaker |
| | 22 | 26 | Male | India | Hindu | Coronary artery disease | A523/06 | Undertaker |
| Nov | - | - | - | - | - | - | - | - |
| Dec | 23 | 41 | Male | Chinese | Buddha | Carbon monoxide poisoning | A596/06 | Undertaker |
| | 24 | 21 | Male | - | Christian | Bronchiol asthma | A606/06 | Undertaker |
| | 25 | 33 | Male | Myanmar | - | Undetermined | A608/06 | Undertaker |
| | 26 | 21 | Female | Indonesian | Islam | Hanging | A610/06 | Undertaker |
| | 27 | 69 | Male | India | Hindu | Myocardial infarction | A620/06 | Undertaker |

Total number of dead bodies in year 2006 = **27**

## Appendix 3 (e)

Total number of unidentified dead bodies in year 2007.

| Month | No. | Age | Sex | Race | Religion | Cause of Death | Autopsy No. | Action |
|---|---|---|---|---|---|---|---|---|
| Jan | 1 | - | Male | - | - | Drowning | A15/07 | Undertaker |
| | 2 | 50 | Male | Chinese | Buddha | Liver cirrhosis | A43/07 | Undertaker |
| Feb | 3 | 33 | Male | Indonesian | Islam | Undetermined | A85/07 | Undertaker |
| March | 4 | 36 | Male | Bangladesh | Islam | Ischemic heart disease | A143/07 | Undertaker |
| April | - | - | - | - | - | - | - | - |
| May | - | - | - | - | - | - | - | - |
| June | 5 | 33 | Female | Liberian | Christian | Multiple injury consistent with fall | A245/07 | Undertaker |
| | 6 | 27 | Male | Nepal | Hindu | Undetermined | A253/07 | Undertaker |
| July | - | - | - | - | - | - | - | - |
| August | - | - | - | - | - | - | - | - |
| Sept | 7 | Adult | Male | Vietnamese | Buddha | Undetermined | A390/07 | Undertaker |
| Okt | - | - | - | - | - | - | - | - |
| Nov | 8 | 54 | Male | Sabahan | Islam | Congestive cardiac failure | A461/07 | JAWI |
| Dec | 9 | 29 | Male | Bangladesh | Islam | Undetermined | A528/07 | Undertaker |
| | 10 | 21 | Male | Bangladesh | Islam | Motor-vehicle accident | A532/07 | Undertaker |
| | 11 | 25 | Female | Vietnamese | Buddha | Lightning | A541/07 | Undertaker |

Total number of dead bodies in year 2007 = **11**

## Appendix 3 (f)

Total number of unidentified dead bodies in year 2008.

| Month | No. | Age | Sex | Race | Religion | Cause of Death | Autopsy No. | Action |
|---|---|---|---|---|---|---|---|---|
| Jan | - | - | - | - | - | - | - | - |
| Feb | 1 | 32 | Male | India | Hindu | Ischemic heart disease | A82/08 | Undertaker |
| March | - | - | - | - | - | - | - | - |
| April | 2 | 30 | Male | Nepal | Hindu | Undetermined | A154/08 | Undertaker |
| May | - | - | - | - | - | - | - | - |
| June | 3 | 45 | Male | Nepal | Hindu | Coronary artery disease | A232/08 | Undertaker |
| | 4 | 35 | Male | Nepal | Hindu | Acute poisoning | A238/08 | Undertaker |
| July | 5 | 34 | Male | Bangladesh | Islam | Multiple injury consistent with fall | A288/08 | Undertaker |
| | 6 | 41 | Male | India | Hindu | Myocardial infarction | A301/08 | Undertaker |
| August | 7 | 26 | Male | Chinese | Buddha | Undetermined | A318/08 | Undertaker |
| | 8 | 42 | Male | India | Hindu | Asphyxia | A341/08 | Undertaker |
| Sept | 9 | | Male | - | - | Fourth degree burn | A376/08 | JAWI |
| Okt | 10 | 42 | Male | - | - | Ischemic heart disease | A421/08 | Undertaker |
| | 11 | 35 | Male | Bangladesh | Islam | Chronic renal failure | A434/08 | Undertaker |
| | 12 | 57 | Male | Malay | Islam | Traumatic intracranial | A443/08 | Undertaker |
| Nov | 13 | 72 | Male | India | Hindu | Coronary heart disease | A475/08 | Undertaker |
| | 14 | 22 | Male | - | | Acute respiratory distress syndrome | A503/08 | Undertaker |
| Dec | 15 | 53 | Male | Chinese | Buddha | Severe head injury due to multiple skull fracture | A513/08 | Undertaker |
| | 16 | 30 | Female | Indonesian | Islam | Asphyia due to hanging | A517/08 | Undertaker |

Total number of dead bodies in year 2008 = **16**

## Appendix 4 (a)

Cases requiring DNA identification from bones from year 2004.

| Deceased | Autopsy No. | Type of samples | Police report no. |
|---|---|---|---|
| Unknown | A218/04 | 1. Bone marrow (DNA) | Seri Kembangan 2886/04 |
| Unknown | A259/04 | 1. Bone marrow (DNA)<br>2. Clothing - shirt and underwear | Petaling Jaya 5444/04 |

## Appendix 4 (b)

Cases requiring DNA identification from bones from year 2005.

| Deceased | Autopsy No. | Type of samples | Police report no. |
|---|---|---|---|
| Unknown | A183/05 | 1. Sternum (DNA)<br>2. Head hair (DNA)<br>3. Tooth (DNA) | Bukit Puchong 3164/05. The specimens were preserved to be used if necessity comes for DNA study |
| x | A243/05 | 1. Kidney, liver, spleen (toxicity and drug)<br>2. Kidney, liver, spleen (DNA)<br>3. Teeth (DNA) | Sealed |
| Unknown | A269/05 | 1. Bone marrow and muscle (DNA)<br>2. Head hair (DNA) | Sealed |
| Unknown | A320/05 | 1. Scalp hair<br>2. Bone sternum<br>3. Muscle<br>4. Tooth (DNA)<br>5. Clothings | Sealed |
| x | A324/05 | 1. Blood<br>2. Liver, kidney, muscle, and bone (DNA)<br>3. Scalp hair (DNA) | Sealed |
| x | A327/05 | 1. Blood (DNA)<br>2. Liver, spleen, bone (DNA)<br>3. Kidney | Sealed |
| Unknown | A364/05 | 1. Blood<br>2. Muscle and bone (DNA)<br>3. Right and left nail clipping | Sealed |
| Unknown | A475/05 | 1. Scalp hair (DNA)<br>2. Teeth (7 pieces) (DNA)<br>3. Skin (DNA) | Sealed |
| x | A626/05 | 1. Blood, liver, bone, scalp hair (DNA and matching) | Sealed |

**Appendix 4 (c)**

Cases requiring DNA identification from bones from year 2006.

| Deceased | Autopsy No. | Type of samples | Police report no. |
|---|---|---|---|
| x | A26/06 | 1. Blood<br>2. Scalp hair (DNA)<br>3. Bone and muscle (DNA)<br>4. Liver, spleen and kidney (toxicology) | Brickfield 571/06 |
| x | A46/06 | Muscle and bone (alcohol, drug and DNA) | Brickfield 864/06 |
| x | A251/06 | 1. Blood (drug)<br>2. Muscle and bone (DNA)<br>3. Anal and oral swab (spermatozoa) | Subang Jaya 3372/06 |
| Unknown | A339/06 | 1. Blood<br>2. Right and left nail clipping<br>3. Head hair<br>4. Bone, liver, and muscle (DNA) | Dengkil 4893/06 |
| Unknown | A462/06 | 1. Bone marrow (DNA)<br>2. Head hair<br>3. Pubic hair | Sea Park 7152/06 |
| Unknown | A473/06 | 1. Blood (Toxicology and DNA)<br>2.Bone (DNA) | Putra Heights 2183/06 |

## Appendix 4 (d)

Cases requiring DNA identification from bones from year 2007.

| Deceased | Autopsy No. | Type of samples | Police report no. |
|---|---|---|---|
| Unknown | A20/07 | 1. Blood (toxicology)<br>2. Bone and head hair (DNA) | Puchong 278/07 |

**Appendix 4 (e)**

Details of the selected case (orange highlighted)

Case 1

| Deceased | Autopsy No. | Type of samples | Police report no. |
|---|---|---|---|
| Unknown | A183/05 | 1. Sternum (DNA)<br>2. Head hair (DNA)<br>3. Tooth (DNA) | Bukit Puchong 3164/05.<br>The specimens were preserved to be used if necessity comes for DNA study. |

1. Unknown body
2. Decomposed body
3. Sex: Male
4. Age: Adult
5. Ethnic group: Not known
6. Marital status: Not known
7. Occupation: Not known
8. Specimen handled to police:
    i. piece of sternum
    ii. tooth
    iii. head hair.
9. Result: The specimens were preserved to be used if necessity comes for DNA study.
10. Cause of death: Drowning
11. External examination:
    i. Body was averagely nourished
    ii. medium size
    iii. muscular
    iv. adult male
    v. 170cm in length
    vi. 50kg in weight

**Appendix 4 (f)**

Case 2

| Deceased | Autopsy No. | Type of samples | Police report no. |
|---|---|---|---|
| Unknown | A320/05 | 1. Scalp hair | |
| | | 2. Bone sternum | |
| | | 3. Muscle | Sealed |
| | | 4. Tooth (DNA) | |
| | | 5. Clothings | |

1. Unknown body
2. Decomposed body, partly skeletonized, 160cm length, 28kg weight
3. Sex: Male
4. Age: Not known
5. Ethnic group: Not known
6. Marital status: Not known
7. Occupation: Not known
8. Specimen handled to police:
    i. Hair
    ii. Tooth
    iii. Sternum
    iv. psoas muscle
9. DNA report: pending for identification.
10. Specimen sent to Parasitology Department: Maggots
11. Cause of death: Multiple slash wound due to sharp edge wound

**Appendix 4 (g)**

Case 3

| Deceased | Autopsy No. | Type of samples | Police report no. |
|---|---|---|---|
| Unknown | A473/06 | 1. Blood (Toxicology and DNA)<br>2.Bone (DNA) | Putra Heights 2183/06 |

1. Unknown body
2. Advanced decomposition, complexion cannot appreciate.
3. Sex: Male
4. Age: Adult
5. Ethnic group: Not known
6. Marital status: Not known
7. Occupation: Not known
8. External examination:
    i. body well nourished
    ii. medium sized
    iii. adult male
    iv. 170cm length
    v. 50kg in length
    vi. Ear, nose, lip, mouth, tongue, and finger were unremarkable.
    vii. Hands - sodden
9. Further examination:
    i. Blood – routine toxicology
    ii. Blood, bone, and head hair – DNA analysis
10. Toxicology report: Pending.
11. Cause of death: Drowning

**Appendix 4 (h)**

Case 4

| Deceased | Autopsy No. | Type of samples | Police report no. |
|---|---|---|---|
| Unknown | A20/07 | 1. Blood (toxicology)<br>2. Bone and head hair (DNA) | Puchong 278/07 |

1. Unknown body
2. Sex: Male
3. Age: Adult
4. Ethnic group: Not known
5. Marital status: Not known
6. Occupation: Not known
7. External examination:
    i. body burnt
    ii. fairly nourished
    iii. medium sized
    iv. male
    v. 156cm length
    vi. 39kg in length
8. Specimen handled to police:
    i. Blood from body cavity for routine toxicology
    ii. Head hair, body hair, bone, tooth, and muscle – DNA analysis
9. Toxicology report: Pending.
10. Cause of death: Burn

## APPENDIX 5

STATISTIK ORANG HILANG/JUMPA SELURUH MALAYSIA

### Appendix 5 (a)

Data on missing person and traced alive according to age and sex (Jan-Dec 2004).

| Age | Total Number of missing person | | Traced alive | | Remained missing | |
|---|---|---|---|---|---|---|
| | Male | Female | Male | Female | Male | Female |
| Below 9 | 45 | 44 | 30 | 28 | 15 | 16 |
| 10-13 | 105 | 165 | 90 | 138 | 15 | 27 |
| 14-17 | 343 | 1, 248 | 248 | 953 | 95 | 295 |
| 18-21 | 132 | 626 | 82 | 426 | 50 | 200 |
| Above 22 | 604 | 573 | 365 | 342 | 239 | 231 |
| Unknown | 209 | 360 | 112 | 207 | 97 | 153 |
| **Total** | **1, 438** | **3, 016** | **927** | **2, 094** | **511** | **922** |
| **Grand total** | **4, 454** | | **3, 021** | | **1, 433** | |

**Appendix 5 (b)**

Data on missing person and traced alive according to age and sex (Jan-Dec 2005).

| | Total Number of missing person | | Traced alive | | Remained missing | |
|---|---|---|---|---|---|---|
| **Age** | Male | Female | Male | Female | Male | Female |
| Below 9 | 36 | 27 | 21 | 19 | 15 | 8 |
| 10-13 | 100 | 109 | 80 | 85 | 20 | 24 |
| 14-17 | 300 | 960 | 197 | 705 | 103 | 255 |
| 18-21 | 119 | 502 | 77 | 318 | 42 | 184 |
| Above 22 | 420 | 486 | 231 | 282 | 189 | 204 |
| Unknown | 145 | 246 | 64 | 117 | 81 | 129 |
| **Total** | **1, 120** | **2, 330** | **670** | **2, 196** | **450** | **804** |
| **Grand total** | **3, 450** | | **2, 196** | | **1, 254** | |

**Appendix 5 (c)**

Data on missing person and traced alive according to age and sex (Jan-Dec 2006).

| Age | Total Number of missing person | | Traced alive | | Remained missing | |
|---|---|---|---|---|---|---|
| | Male | Female | Male | Female | Male | Female |
| Below 9 | 23 | 27 | 15 | 19 | 8 | 8 |
| 10-13 | 71 | 125 | 45 | 93 | 26 | 32 |
| 14-17 | 171 | 836 | 113 | 549 | 58 | 287 |
| 18-21 | 84 | 364 | 46 | 201 | 38 | 163 |
| Above 22 | 334 | 339 | 173 | 178 | 161 | 161 |
| Unknown | 95 | 223 | 42 | 105 | 53 | 118 |
| **Total** | **778** | **1, 914** | **434** | **1, 145** | **344** | **769** |
| **Grand total** | **2, 692** | | **1, 579** | | **1, 113** | |

**Appendix 5 (d)**

Data on missing person and traced alive according to age and sex (Jan-Dec 2007).

| | Total Number of missing person | | Traced alive | | Remained missing | |
|---|---|---|---|---|---|---|
| **Age** | Male | Female | Male | Female | Male | Female |
| Below 9 | 26 | 24 | 12 | 16 | 14 | 8 |
| 10-13 | 53 | 128 | 38 | 90 | 15 | 38 |
| 14-17 | 144 | 799 | 84 | 528 | 60 | 271 |
| 18-21 | 57 | 358 | 32 | 195 | 25 | 163 |
| Above 22 | 272 | 276 | 139 | 154 | 133 | 122 |
| Unknown | 68 | 128 | 31 | 72 | 37 | 56 |
| **Total** | **620** | **1, 713** | **336** | **1, 055** | **284** | **658** |
| **Grand total** | **2, 333** | | **1, 391** | | **942** | |

**Appendix 5 (e)**

Data on missing person and traced alive according to age and sex (Jan-Dec 2008).

| | Total Number of missing person | | Traced alive | | Remained missing | |
|---|---|---|---|---|---|---|
| **Age** | Male | Female | Male | Female | Male | Female |
| Below 9 | 22 | 11 | 11 | 3 | 11 | 8 |
| 10-13 | 74 | 156 | 46 | 104 | 28 | 52 |
| 14-17 | 131 | 819 | 65 | 477 | 66 | 342 |
| 18-21 | 55 | 286 | 29 | 124 | 26 | 162 |
| Above 22 | 384 | 281 | 115 | 115 | 269 | 166 |
| Unknown | 0 | 0 | 0 | 0 | 0 | 0 |
| **Total** | **666** | **1, 553** | **266** | **823** | **400** | **730** |
| **Grand total** | **2, 219** | | **1, 089** | | **1, 130** | |

**Appendix 5 (f)**

Data on missing person and traced alive according to age and sex (Jan-15th Jul 2009).

| | Total Number of missing person | | Traced alive | | Remained missing | |
|---|---|---|---|---|---|---|
| Age | Male | Female | Male | Female | Male | Female |
| Below 9 | 15 | 13 | 7 | 10 | 8 | 3 |
| 10-13 | 38 | 97 | 18 | 55 | 20 | 42 |
| 14-17 | 92 | 482 | 35 | 212 | 57 | 270 |
| 18-21 | 41 | 187 | 19 | 69 | 22 | 118 |
| Above 22 | 204 | 195 | 86 | 65 | 118 | 130 |
| Unknown | 0 | 0 | 0 | 0 | 0 | 0 |
| **Total** | **390** | **974** | **165** | **411** | **225** | **563** |
| **Grand total** | **1, 364** | | **576** | | **788** | |

**STATISTIK ORANG HILANG SELURUH MALAYSIA MENGIKUT PECAHAN SEBAB HILANG / JANTINA / UMUR**
**MULAI : JANUARI 2004 HINGGA : DISEMBER 2004**



## KESELURUHAN

| SEBAB HILANG | 9 TH KE BAWAH | | 10 - 13 TAHUN | | 14 - 17 TAHUN | | 18 - 21 TAHUN | | 22 THN KE ATAS | | TIDAK DIKETAHUI | | JUMLAH | | JUMLAH BESAR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | L | P | L | P | L | P | L | P | L | P | L | P | L | P | |
| PENDERAAN | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 2 | 3 |
| MENCARI PEKERJAAN | 0 | 0 | 3 | 2 | 27 | 47 | 10 | 42 | 19 | 23 | 3 | 13 | 62 | 127 | 189 |
| DIPENGARUHI OLEH KAWAN | 1 | 3 | 27 | 47 | 94 | 284 | 19 | 59 | 21 | 34 | 18 | 39 | 180 | 466 | 646 |
| IKUT KEKASIH | 0 | 0 | 0 | 21 | 1 | 296 | 0 | 267 | 0 | 109 | 0 | 72 | 1 | 765 | 766 |
| DITIPU DIJADIKAN PELACUR | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TIDAK MINAT BELAJAR | 0 | 0 | 15 | 7 | 26 | 30 | 5 | 6 | 0 | 0 | 5 | 2 | 51 | 45 | 96 |
| CARI KEBEBASAN DI LUAR RUMAH | 5 | 3 | 12 | 23 | 55 | 205 | 12 | 61 | 20 | 29 | 11 | 20 | 115 | 341 | 456 |
| PENAGIHAN DADAH | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 22 | 1 | 1 | 0 | 24 | 1 | 25 |
| SELISIH FAHAM DENGAN KELUARGA | 2 | 1 | 5 | 13 | 47 | 134 | 10 | 52 | 45 | 139 | 18 | 54 | 127 | 393 | 520 |
| KURANG DAPAT PERHATIAN KELUARGA | 1 | 1 | 2 | 3 | 4 | 5 | 0 | 0 | 1 | 1 | 6 | 3 | 14 | 13 | 27 |
| TIDAK SIUMAN / KEBODOHAN | 3 | 3 | 2 | 2 | 14 | 2 | 12 | 9 | 93 | 47 | 26 | 20 | 150 | 83 | 233 |
| GAGAL PEPERIKSAAN | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 2 | 0 | 0 | 2 | 3 | 5 |
| LARI DRP PUSAT PERLINDUNGAN WANITA | 0 | 0 | 0 | 3 | 0 | 15 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 21 | 21 |
| MANGSA CABUL / ROGOL OLEH KELUARGA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MALU KEPADA MASYARAKAT DI SEKELILING | 0 | 0 | 0 | 1 | 1 | 2 | 0 | 2 | 1 | 0 | 0 | 1 | 2 | 6 | 8 |
| DICULIK / DIBUNUH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| HILANG DI LAUT | 0 | 0 | 1 | 2 | 3 | 0 | 3 | 2 | 31 | 2 | 1 | 1 | 39 | 7 | 46 |
| HILANG DIHUTAN | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 8 | 1 | 12 | 3 | 15 |
| BENCANA ALAM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 1 | 2 | 2 | 4 |
| DILARIKAN OLEH IBU / BAPA | 4 | 10 | 4 | 4 | 0 | 4 | 0 | 0 | 0 | 0 | 23 | 23 | 31 | 41 | 72 |
| TIDAK DIKETAHUI | 28 | 19 | 24 | 35 | 61 | 216 | 56 | 122 | 316 | 175 | 76 | 101 | 561 | 668 | 1,229 |
| LAIN-LAIN | 0 | 2 | 9 | 2 | 10 | 6 | 3 | 3 | 29 | 10 | 13 | 6 | 64 | 29 | 93 |
| **JUMLAH** | **45** | **44** | **105** | **165** | **343** | **1,248** | **132** | **626** | **604** | **573** | **209** | **360** | **1,438** | **3,016** | **4,454** |
| **JUMLAH BESAR** | **89** | | **270** | | **1,591** | | **758** | | **1,177** | | **569** | | **4,454** | | |

## STATISTIK ORANG HILANG SELURUH MALAYSIA MENGIKUT PECAHAN SEBAB HILANG / JANTINA / UMUR
## MULAI : JANUARI 2005 HINGGA : DISEMBER 2005

### KESELURUHAN

| SEBAB HILANG | 9 TH KE BAWAH | | 10 - 13 TAHUN | | 14 - 17 TAHUN | | 18 - 21 TAHUN | | 22 THN KE ATAS | | TIDAK DIKETAHUI | | JUMLAH | | JUMLAH BESAR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | L | P | L | P | L | P | L | P | L | P | L | P | L | P | |
| PENDERAAN | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 |
| MENCARI PEKERJAAN | 0 | 0 | 0 | 4 | 13 | 41 | 9 | 33 | 23 | 21 | 4 | 13 | 49 | 112 | 161 |
| DIPENGARUHI OLEH KAWAN | 0 | 2 | 21 | 26 | 61 | 232 | 11 | 41 | 12 | 23 | 9 | 25 | 114 | 349 | 463 |
| IKUT KEKASIH | 0 | 0 | 0 | 19 | 0 | 250 | 2 | 176 | 1 | 108 | 1 | 52 | 4 | 605 | 609 |
| DITIPU DIJADIKAN PELACUR | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 |
| TIDAK MINAT BELAJAR | 0 | 0 | 11 | 8 | 39 | 17 | 5 | 5 | 0 | 0 | 0 | 0 | 55 | 30 | 85 |
| CARI KEBEBASAN DI LUAR RUMAH | 2 | 2 | 13 | 16 | 37 | 124 | 20 | 48 | 14 | 24 | 10 | 30 | 96 | 244 | 340 |
| PENAGIHAN DADAH | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 4 | 0 | 0 | 1 | 6 | 1 | 7 |
| SELISIH FAHAM DENGAN KELUARGA | 2 | 3 | 15 | 12 | 45 | 91 | 9 | 50 | 26 | 116 | 13 | 30 | 110 | 302 | 412 |
| KURANG DAPAT PERHATIAN KELUARGA | 0 | 0 | 5 | 4 | 2 | 3 | 0 | 2 | 1 | 0 | 2 | 1 | 10 | 10 | 20 |
| TIDAK SIUMAN / KEBODOHAN | 2 | 1 | 3 | 1 | 7 | 6 | 19 | 13 | 87 | 40 | 17 | 23 | 135 | 84 | 219 |
| GAGAL PEPERIKSAAN | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| LARI DRP PUSAT PERLINDUNGAN WANITA | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 10 | 10 |
| MANGSA CABUL / ROGOL OLEH KELUARGA | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 2 |
| MALU KEPADA MASYARAKAT DI SEKELILING | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 3 | 0 | 0 | 0 | 3 | 3 | 6 |
| DICULIK / DIBUNUH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| HILANG DI LAUT | 1 | 0 | 2 | 0 | 4 | 1 | 3 | 0 | 11 | 0 | 8 | 0 | 29 | 1 | 30 |
| HILANG DIHUTAN | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 3 | 4 | 1 | 2 | 2 | 8 | 6 | 14 |
| BENCANA ALAM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| DILARIKAN OLEH IBU / BAPA | 6 | 3 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 8 | 4 | 16 | 8 | 24 |
| TIDAK DIKETAHUI | 23 | 13 | 25 | 19 | 78 | 173 | 33 | 122 | 214 | 146 | 52 | 65 | 425 | 538 | 963 |
| LAIN-LAIN | 0 | 3 | 3 | 0 | 12 | 7 | 6 | 3 | 19 | 7 | 19 | 0 | 59 | 20 | 79 |
| JUMLAH | 36 | 27 | 100 | 109 | 300 | 960 | 119 | 502 | 420 | 486 | 145 | 246 | 1,120 | 2,330 | 3,450 |
| JUMLAH BESAR | 63 | | 209 | | 1,260 | | 621 | | 906 | | 391 | | 3,450 | | |

## STATISTIK ORANG HILANG SELURUH MALAYSIA MENGIKUT PECAHAN SEBAB HILANG / JANTINA / UMUR
## MULAI : JANUARI 2006 HINGGA : DISEMBER 2006

### KESELURUHAN

| SEBAB HILANG | 9 TH KE BAWAH | | 10 - 13 TAHUN | | 14 - 17 TAHUN | | 18 - 21 TAHUN | | 22 THN KE ATAS | | TIDAK DIKETAHUI | | JUMLAH | | JUMLAH BESAR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | L | P | L | P | L | P | L | P | L | P | L | P | L | P | |
| PENDERAAN | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 4 | 4 |
| MENCARI PEKERJAAN | 0 | 0 | 0 | 0 | 6 | 22 | 9 | 15 | 17 | 12 | 0 | 7 | 32 | 56 | 88 |
| DIPENGARUHI OLEH KAWAN | 1 | 0 | 16 | 37 | 30 | 189 | 6 | 31 | 8 | 27 | 9 | 34 | 70 | 318 | 388 |
| IKUT KEKASIH | 0 | 2 | 0 | 24 | 3 | 273 | 1 | 139 | 3 | 82 | 1 | 48 | 8 | 568 | 576 |
| DITIPU DIJADIKAN PELACUR | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 3 | 3 |
| TIDAK MINAT BELAJAR | 0 | 0 | 13 | 2 | 17 | 17 | 2 | 5 | 1 | 3 | 2 | 3 | 35 | 30 | 65 |
| CARI KEBEBASAN DI LUAR RUMAH | 1 | 0 | 7 | 28 | 22 | 142 | 13 | 43 | 20 | 26 | 6 | 18 | 69 | 257 | 326 |
| PENAGIHAN DADAH | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 4 | 6 | 0 | 0 | 1 | 6 | 6 | 12 |
| SELISIH FAHAM DENGAN KELUARGA | 1 | 8 | 13 | 6 | 30 | 29 | 7 | 36 | 22 | 70 | 5 | 40 | 78 | 189 | 267 |
| KURANG DAPAT PERHATIAN KELUARGA | 0 | 0 | 3 | 5 | 1 | 5 | 0 | 4 | 1 | 1 | 1 | 2 | 6 | 17 | 23 |
| TIDAK SIUMAN / KEBODOHAN | 0 | 0 | 2 | 0 | 4 | 5 | 14 | 6 | 60 | 21 | 7 | 5 | 87 | 37 | 124 |
| GAGAL PEPERIKSAAN | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 |
| LARI DRP PUSAT PERLINDUNGAN WANITA | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 4 | 0 | 0 | 0 | 1 | 0 | 7 | 7 |
| MANGSA CABUL / ROGOL OLEH KELUARGA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MALU KEPADA MASYARAKAT DI SEKELILING | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 4 | 4 |
| DICULIK / DIBUNUH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 2 | 2 |
| HILANG DI LAUT | 0 | 0 | 3 | 0 | 4 | 1 | 4 | 0 | 12 | 1 | 5 | 0 | 28 | 2 | 30 |
| HILANG DIHUTAN | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 5 | 1 | 2 | 1 | 9 | 4 | 13 |
| BENCANA ALAM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| DILARIKAN OLEH IBU / BAPA | 1 | 4 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 3 | 7 | 5 | 10 | 14 | 24 |
| TIDAK DIKETAHUI | 17 | 11 | 12 | 18 | 51 | 141 | 24 | 73 | 156 | 80 | 43 | 49 | 303 | 372 | 675 |
| LAIN-LAIN | 1 | 0 | 1 | 3 | 2 | 4 | 3 | 3 | 23 | 8 | 7 | 5 | 37 | 23 | 60 |
| JUMLAH | 23 | 27 | 71 | 125 | 171 | 836 | 84 | 364 | 334 | 339 | 95 | 223 | 778 | 1,914 | 2,692 |
| JUMLAH BESAR | 50 | | 196 | | 1,007 | | 448 | | 673 | | 318 | | 2,692 | | |

**STATISTIK ORANG HILANG SELURUH MALAYSIA MENGIKUT PECAHAN SEBAB HILANG / JANTINA / UMUR**
**MULAI : JANUARI 2007 HINGGA : DISEMBER 2007**

KESELURUHAN

| SEBAB HILANG | 9 TH KE BAWAH | | 10 - 13 TAHUN | | 14 - 17 TAHUN | | 18 - 21 TAHUN | | 22 THN KE ATAS | | TIDAK DIKETAHUI | | JUMLAH | | JUMLAH BESAR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | L | P | L | P | L | P | L | P | L | P | L | P | L | P | |
| PENDERAAN | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 1 | 0 | 1 | 3 | 3 | 6 |
| MENCARI PEKERJAAN | 0 | 0 | 1 | 0 | 2 | 17 | 9 | 31 | 18 | 15 | 4 | 4 | 34 | 67 | 101 |
| DIPENGARUHI OLEH KAWAN | 1 | 2 | 11 | 34 | 37 | 150 | 3 | 38 | 11 | 29 | 7 | 11 | 70 | 264 | 334 |
| IKUT KEKASIH | 0 | 0 | 2 | 27 | 7 | 237 | 1 | 113 | 6 | 49 | 1 | 27 | 17 | 453 | 470 |
| DITIPU DIJADIKAN PELACUR | 0 | 0 | 0 | 1 | 2 | 2 | 0 | 1 | 0 | 1 | 0 | 0 | 2 | 5 | 7 |
| TIDAK MINAT BELAJAR | 0 | 1 | 7 | 5 | 16 | 23 | 1 | 4 | 0 | 1 | 2 | 1 | 26 | 35 | 61 |
| CARI KEBEBASAN DI LUAR RUMAH | 1 | 1 | 9 | 19 | 30 | 145 | 6 | 44 | 6 | 11 | 5 | 11 | 57 | 231 | 288 |
| PENAGIHAN DADAH | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 4 | 0 | 1 | 0 | 6 | 1 | 7 |
| SELISIH FAHAM DENGAN KELUARGA | 1 | 0 | 7 | 18 | 11 | 67 | 5 | 38 | 18 | 49 | 3 | 18 | 45 | 190 | 235 |
| KURANG DAPAT PERHATIAN KELUARGA | 1 | 1 | 3 | 1 | 4 | 5 | 0 | 3 | 5 | 2 | 0 | 2 | 13 | 14 | 27 |
| TIDAK SIUMAN / KEBODOHAN | 1 | 4 | 1 | 0 | 3 | 3 | 5 | 2 | 65 | 23 | 8 | 16 | 83 | 48 | 131 |
| GAGAL PEPERIKSAAN | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 2 |
| LARI DRP PUSAT PERLINDUNGAN WANITA | 0 | 0 | 0 | 1 | 0 | 5 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 8 | 8 |
| MANGSA CABUL / ROGOL OLEH KELUARGA | 0 | 0 | 0 | 0 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 5 |
| MALU KEPADA MASYARAKAT DI SEKELILING | 0 | 0 | 0 | 0 | 0 | 4 | 1 | 1 | 1 | 0 | 0 | 0 | 2 | 5 | 7 |
| DICULIK / DIBUNUH | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 3 | 3 |
| HILANG DI LAUT | 0 | 0 | 1 | 0 | 1 | 1 | 2 | 0 | 5 | 0 | 4 | 0 | 13 | 1 | 14 |
| HILANG DIHUTAN | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 1 | 0 | 4 | 0 | 4 |
| BENCANA ALAM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 2 |
| DILARIKAN OLEH IBU / BAPA | 7 | 5 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 1 | 3 | 2 | 12 | 9 | 21 |
| TIDAK DIKETAHUI | 12 | 10 | 8 | 22 | 25 | 129 | 23 | 76 | 105 | 84 | 26 | 32 | 199 | 353 | 552 |
| LAIN-LAIN | 1 | 0 | 3 | 0 | 3 | 5 | 0 | 5 | 19 | 8 | 3 | 1 | 29 | 19 | 48 |
| JUMLAH | 26 | 24 | 53 | 128 | 144 | 799 | 57 | 358 | 272 | 276 | 68 | 128 | 620 | 1,713 | 2,333 |
| JUMLAH BESAR | 50 | | 181 | | 943 | | 415 | | 548 | | 196 | | 2,333 | | |

## STATISTIK ORANG HILANG SELURUH MALAYSIA MENGIKUT PECAHAN SEBAB HILANG / JANTINA / UMUR
## MULAI : JANUARI 2008 HINGGA : DISEMBER 2008

### KESELURUHAN

| SEBAB HILANG | 9 TH KE BAWAH | | 10 - 13 TAHUN | | 14 - 17 TAHUN | | 18 - 21 TAHUN | | 22 THN KE ATAS | | TIDAK DIKETAHUI | | JUMLAH | | JUMLAH BESAR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | L | P | L | P | L | P | L | P | L | P | L | P | L | P | |
| PENDERAAN | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 |
| MENCARI PEKERJAAN | 0 | 0 | 0 | 0 | 6 | 14 | 8 | 23 | 15 | 9 | 0 | 0 | 29 | 46 | 75 |
| DIPENGARUHI OLEH KAWAN | 2 | 1 | 19 | 45 | 33 | 190 | 3 | 35 | 25 | 15 | 0 | 0 | 82 | 286 | 368 |
| IKUT KEKASIH | 0 | 0 | 1 | 29 | 2 | 257 | 2 | 107 | 6 | 57 | 0 | 0 | 11 | 450 | 461 |
| DITIPU DIJADIKAN PELACUR | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| TIDAK MINAT BELAJAR | 1 | 0 | 6 | 6 | 10 | 17 | 3 | 1 | 1 | 1 | 0 | 0 | 21 | 25 | 46 |
| CARI KEBEBASAN DI LUAR RUMAH | 1 | 0 | 8 | 35 | 23 | 131 | 2 | 35 | 17 | 26 | 0 | 0 | 51 | 227 | 278 |
| PENAGIHAN DADAH | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 7 | 1 | 0 | 0 | 7 | 3 | 10 |
| SELISIH FAHAM DENGAN KELUARGA | 1 | 1 | 14 | 9 | 15 | 67 | 1 | 19 | 16 | 50 | 0 | 0 | 47 | 146 | 193 |
| KURANG DAPAT PERHATIAN KELUARGA | 0 | 0 | 0 | 1 | 0 | 6 | 1 | 2 | 2 | 2 | 0 | 0 | 3 | 11 | 14 |
| TIDAK SIUMAN / KEBODOHAN | 0 | 0 | 2 | 0 | 7 | 1 | 5 | 3 | 77 | 31 | 0 | 0 | 91 | 35 | 126 |
| GAGAL PEPERIKSAAN | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 1 | 0 | 0 | 0 | 3 | 1 | 4 |
| LARI DRP PUSAT PERLINDUNGAN WANITA | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 2 | 2 | 4 |
| MANGSA CABUL / ROGOL OLEH KELUARGA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MALU KEPADA MASYARAKAT DI SEKELILING | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 |
| DICULIK / DIBUNUH | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| HILANG DI LAUT | 1 | 0 | 3 | 0 | 2 | 0 | 3 | 0 | 10 | 0 | 0 | 0 | 19 | 0 | 19 |
| HILANG DIHUTAN | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 |
| BENCANA ALAM | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| DILARIKAN OLEH IBU / BAPA | 5 | 6 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 9 | 7 | 16 |
| TIDAK DIKETAHUI | 6 | 2 | 16 | 28 | 29 | 127 | 20 | 55 | 170 | 81 | 0 | 0 | 241 | 293 | 534 |
| LAIN-LAIN | 5 | 1 | 3 | 2 | 2 | 5 | 4 | 3 | 33 | 5 | 0 | 0 | 47 | 16 | 63 |
| JUMLAH | 22 | 11 | 74 | 156 | 131 | 819 | 55 | 286 | 384 | 281 | 0 | 0 | 666 | 1,553 | 2,219 |
| JUMLAH BESAR | 33 | | 230 | | 950 | | 341 | | 665 | | 0 | | 2,219 | | |

## STATISTIK ORANG HILANG SELURUH MALAYSIA MENGIKUT PECAHAN SEBAB HILANG / JANTINA / UMUR
## MULAI : JANUARI 2009 HINGGA : 15 JULAI 2009

KESELURUHAN

| SEBAB HILANG | 9 TH KE BAWAH | | 10 - 13 TAHUN | | 14 - 17 TAHUN | | 18 - 21 TAHUN | | 22 THN KE ATAS | | TIDAK DIKETAHUI | | JUMLAH | | JUMLAH BESAR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | L | P | L | P | L | P | L | P | L | P | L | P | L | P | |
| PENDERAAN | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MENCARI PEKERJAAN | 0 | 0 | 0 | 0 | 6 | 19 | 5 | 11 | 9 | 10 | 0 | 0 | 20 | 40 | 60 |
| DIPENGARUHI OLEH KAWAN | 1 | 0 | 2 | 23 | 19 | 93 | 9 | 23 | 7 | 20 | 0 | 0 | 38 | 159 | 197 |
| IKUT KEKASIH | 0 | 0 | 0 | 19 | 2 | 133 | 3 | 75 | 5 | 39 | 0 | 0 | 10 | 266 | 276 |
| DITIPU DIJADIKAN PELACUR | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 5 | 5 |
| TIDAK MINAT BELAJAR | 0 | 1 | 3 | 2 | 4 | 10 | 0 | 1 | 1 | 0 | 0 | 0 | 8 | 14 | 22 |
| CARI KEBEBASAN DI LUAR RUMAH | 0 | 0 | 9 | 13 | 16 | 67 | 1 | 21 | 6 | 12 | 0 | 0 | 32 | 113 | 145 |
| PENAGIHAN DADAH | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 0 | 2 | 1 | 0 | 0 | 4 | 3 | 7 |
| SELISIH FAHAM DENGAN KELUARGA | 0 | 0 | 6 | 9 | 15 | 44 | 1 | 7 | 9 | 25 | 0 | 0 | 31 | 85 | 116 |
| KURANG DAPAT PERHATIAN KELUARGA | 1 | 0 | 0 | 2 | 0 | 4 | 2 | 1 | 2 | 1 | 0 | 0 | 5 | 8 | 13 |
| TIDAK SIUMAN / KEBODOHAN | 0 | 0 | 0 | 0 | 2 | 3 | 4 | 0 | 39 | 21 | 0 | 0 | 45 | 24 | 69 |
| GAGAL PEPERIKSAAN | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 2 | 0 | 0 | 0 | 0 | 3 | 3 | 6 |
| LARI DRP PUSAT PERLINDUNGAN WANITA | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 6 | 6 |
| MANGSA CABUL / ROGOL OLEH KELUARGA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MALU KEPADA MASYARAKAT DI SEKELILING | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 |
| DICULIK / DIBUNUH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| HILANG DI LAUT | 1 | 0 | 1 | 0 | 0 | 0 | 3 | 0 | 9 | 0 | 0 | 0 | 14 | 0 | 14 |
| HILANG DIHUTAN | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 1 | 0 | 0 | 5 | 1 | 6 |
| BENCANA ALAM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 |
| DILARIKAN OLEH IBU / BAPA | 7 | 7 | 0 | 1 | 0 | 2 | 0 | 0 | 2 | 1 | 0 | 0 | 9 | 11 | 20 |
| TIDAK DIKETAHUI | 4 | 5 | 16 | 25 | 23 | 87 | 8 | 38 | 85 | 52 | 0 | 0 | 136 | 207 | 343 |
| LAIN-LAIN | 0 | 0 | 1 | 3 | 3 | 10 | 2 | 5 | 23 | 10 | 0 | 0 | 29 | 28 | 57 |
| JUMLAH | 15 | 13 | 38 | 97 | 92 | 482 | 41 | 187 | 204 | 195 | 0 | 0 | 390 | 974 | 1,364 |
| JUMLAH BESAR | 28 | | 135 | | 574 | | 228 | | 399 | | 0 | | 1,364 | | |